NEW ZEALAND GEOGRAPHER

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The aims of the Society as stated in the constitution are 'to promote and stimulate the study of geography'. These are the aims of more than one Society in the world and the New Zealand Geographical Society is particularly concerned with geography in New Zealand. It is therefore the Society's policy to stimulate geographic studies of New Zealand and matters closely related to the dominion.

The Society undertakes the publication of a journal, the *New Zealand Geographer*, and of a *Record* of its proceedings, both of which at present appear twice a year. Branches of the Society organise lectures, study groups, and excursions, and encourage their members to prepare matter for publication in the *New Zealand Geographer*. Contributions from overseas writers and those who are not members of the Society are also encouraged.

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New Zealand Geographer

OLUME XI October, 1955 NUMBER 2

MIDDLE ISLAND ASCENDANT: NEW ZEALAND IN 1881

PART ONE

KENNETH B. CUMBERLAND AND R. P. HARGREAVES

AT THE MIDPOINT of the nineteenth century New Zealand comprised six separate tightly-confined coastal settlements, or colonies'. They were cut off from each other in the North Island by tangle of profusely forested hills, and in the South (or Middle[1]) Island y lofty alpine ranges, stark expanses of tussock grassland, and almost nfordable rivers running in mile-wide beds.[2] But in 1853 a 'break-hrough' of physical and institutional barriers was imminent. The invit-igly-virgin tussock grasslands were being spied out by land-hungry raziers. The colonisers' dreams of self-contained settlements and their olicy of 'concentration and contiguity' were soon to be nullified by the ale of Crown lands beyond the planned limits of the settlements.

HISTORICAL PERSPECTIVE

Legislation affecting the disposal of land was the spark that induced e conflagration which destroyed the Wakefield system and consumed e policy of compact and continuous settlement of yeomen farmers d of a predominantly arable husbandry. This is not the place to detail e history of land legislation; it is sufficient to notice that Sir George rey's regulations of 1853, the Waste Lands Act of 1858, and the shioning of a system of pastoral licences out of Australian experience pened up to occupancy by a landed 'squattocracy' the grassland plains, sins, downs, foothills and alpine terrains of the South Island and the ss extensive grass or fern-clad areas of the Wairarapa and Hawkes Bay.

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n 1881 both terms were in use, but it is perhaps significant that in parliamentary debates the erm 'Middle Island' was used much more frequently by those active in public life at the time.
. B. Cumberland: '"Jimmy Grants" and "Mihaneres": New Zealand about 1853', *Econ. Geog.*, Vol. 30, No. 1, January 1954, pp. 70-89. See especially Figure 16, p. 87.

Between 1856 and 1876 more than eight million acres of land were sol by the provincial governments, two and a quarter million acres wer given away under a variety of systems of free grant, and by 1881 ove twelve million acres of Crown land were leased as great mountain shee runs, mainly in Canterbury and Otago.[3] The pastoral age had begu and the tide of settlement and economic development flowed swiftl south to the Middle Island.

PASTORAL FOUNDATIONS

In the provinces of Canterbury and Otago income from land sale provided an abundant revenue for public works and social purposes while North Island provinces languished in face of financial difficulties barriers of bush and mud, Maori troubles and restricted communications. Yet paradoxically enough, it was the North Island settlement that remained constrained and compact after 1853. In Nelson, Marlborough, Canterbury and Otago, outside the former companies' blocks tracts of natural grassland airily estimated as stretching from river t river were devoured in mouthfuls, and immediately thereafter whol mountain ranges of inferior grazing land were swallowed at a gulp A raging gluttony marked the appetite of the newly-arrived sheepme who came mainly from across the Tasman, driven out of Australia b drought and poor prices for their wool. In a very few years, first th plains and rolling tussock downland, and next the less accessible backcountry ranges, were taken up under pastoral licences, run by run, t the very margin of the ice and snow of the Southern Alps. They wer soon trodden by hungry, close-grazing, rapidly-expanding flocks. B the late 'fifties New Zealand was already becoming a vast ranch producing wool for the Bradford market.

Australia thus played a prominent part in the foundation of Ne Zealand's pastoral industry. It provided many of the pastoralists— 'prophets', or 'shagroons', as they were nicknamed by the Canterbur 'pilgrims'. They took up enormous sheep runs of twenty to sixt thousand acres in extent alongside baronets, authors, soldiers, parson and lawyers from England, and a sprinkling of Scottish shepherds. Australia provided the original livestock, the hardy Merino, though i was still a stunted runt beside the bigger-boned, heavy-fleeced, fine-wool sheep of today. And, after the discovery of gold in Victoria i 1851, Australia furnished a market for surplus agricultural foodstuff from New Zealand. As late as 1881 New Zealand still conducted a quarter by value of its overseas trade with the five Australian colonies.

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[3] *Statistics of the Colony of New Zealand for the Year 1881*, Wellington, 1882, p. 209.

The speed with which the foundations were laid of an extensive pastoralism based on the rather crude exploitation of unimproved natural grassland is clearly demonstrated by the returns of sheep and the statistics of wool exports. In 1853 there were less than half a million sheep in the infant colony; in 1881 the flocks totalled almost 13,000,000.[4] In 1853 a million pounds of wool, valued at £66,500, were exported; twenty-seven years later almost 67,000,000 pounds, worth more than £3,000,000, were shipped overseas. In the late 1870's wool accounted for half, or more, of the value of total exports. The golden fleece had become the cornerstone of the colony's economy.

Gold Rushes

But meanwhile gold itself had made a major contribution to New Zealand's progress. Gold had been discovered on the doorstep of Auckland, in the hills that provided the setting for the kauri-exporting Coromandel Harbour, as early as 1852, and traces of the metal had been seen in Nelson ten years before that. But it was not until 1861 that Gabriel Read, a prospector with Californian and Australian experience, found gold 'shining like the stars of Orion on a dark frosty night' opposite the Blue Spur in the Tuapeka Valley, Otago, and so transformed the history and speeded the settlement and development not only of a province but of the entire colony. There was a succession of rushes to the dry interior of Central Otago in the next four years. The population of diggers reached a peak of almost 16,000 in 1864. Many of Dunedin's inhabitants left hurriedly for the diggings and thousands of immigrant hopefuls, including hundreds of Chinese, passed through the town. In 1864 the booming southern provincial capital had a population as big as that of the colony's old and new capitals together.

The rush and bustle in Otago, however, was soon exceeded and superseded by the 'golden age' of the rain-soaked, bush-filled valleys of the West Coast. The year 1865 is memorable in New Zealand history for the discoveries of gold in Westland and the influx of diggers into that hitherto overlooked transmontane extension of the province of Canterbury. Despite the unattractive nature of the narrow littoral, the drenching rain, the ugly swollen streams and the thick darkness of the forest, the landscape was soon transformed by thousands of pioneer miners. Mushroom towns with shacks of canvas or of sappy timber banks, shops, and 'hotels' innumerable, sprang up overnight. Hokitika alone had over a hundred hotels and a surging population in 1866 variously and perhaps fancifully estimated as between 35,000 and 50,000. Other towns appeared that today are but a heap of tailings and a few abandoned buildings. Every rocky valley climbing steeply to the lofty background of glacier-cut mountains was penetrated and prospected.[5]

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[4] *Statistics of the Colony of New Zealand . . . (op. cit.).*

GOLD — THE STIMULUS

In the six years from 1860 to 1865 the population of New Zealand more than doubled. Probably 50,000 to 60,000 of the 100,000 arrivals in this period represent those who came with the object of making their fortunes on the goldfields, and many of them stayed after the boom burst and settled down as farmers or in urban occupations. Gold brought not only people but also capital. From 1862 to 1870 gold constituted from fifty to seventy-one percent of the value of New Zealand exports; and in the 1870's it regularly accounted for between twenty and forty percent. Exports of the metal financed the importation of capital goods at a time when they were particularly needed. It led to the foundation of a number of towns that have survived to become regional centres and market towns with a contemporary prosperity based on something more permanent than the yellow metal. Export duties and diggers' licences produced revenue with which roads were laid down, bridges built, harbours designed and public buildings erected. With the decline of Australian markets, the New Zealand diggings provided an opportune market for meat and grain. Directly and indirectly, then, gold proved to be a fillip to agriculture at a time when technology had not yet linked the perishable products of a colonial farm with industrial and urban markets more than 12,000 miles away.

FISCAL POLICIES

A third stimulus to development was the political programme of borrowing to encourage immigration and for the construction of public works—a policy associated with the name of Julius Vogel. During the 1870's the colony's public debt grew by more than £20,000,000.

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[5] Alluvial gold was also worked at the Coromandel and the later Thames fields in the 1860's. But the boom was really over within a decade of Read bringing to Dunedin news of what was later known as Gabriel's Gully; although, with the mining of quartz reefs in the hills of the Coromandel Peninsula and the discovery of smaller alluvial deposits in Nelson, Westland and Otago, a decreasing quantity of gold (from 400,000 to 250,000 ounces) continued to be won until the 1890's when steam-driven bucket dredges brought on a minor second boom.

Canterbury and Otago, with the largest provincial populations, the most rapid agricultural progress and the greatest political influence, secured the lion's share of these public funds. Roads, railways and newly-arrived immigrant labour were the more obvious signs of this expenditure. Less obvious at the time, though perhaps as important in the future development of the nation, were the subsidised overseas steamship lines, the internal and intercolonial shipping companies, the cable connections, the banking and commercial concerns, and the educational services which were established, and the forest conservation policies and experiments with refrigeration which were instituted—all these were stimulated by the availability of funds and the economic prosperity which persisted in the colony until the late 1870's.

Regional Differences Intensified

Such development, continuing with little interruption for more than a generation under the successive stimuli of cheap land, gold mining and overseas borrowing, brought profound changes to the New Zealand landscape. The progress and development, and the resultant transformation of the life and landscape of the country, were by no means everywhere uniform either in degree or in kind. The parts of the country became even more clearly differentiated than nature had intended. The contrasts between the two major islands were sharpened, for now a greater proportion of the population was found in the Middle Island —almost two-thirds in 1867 when the search for gold was at its height. In the Middle Island the grazier and prospector penetrated both the dry, treeless 'continental interior' and the mountain highland, and the occurrence of gold in Westland brought settlement to one of the wettest and most isolated parts of the country. In the North Island the distribution of active settlement and the transformation of the landscape were confined largely to the areas which were already the scene of colonising activity in the 1840's. For both physical and cultural reasons inland penetration remained difficult and, as the intensity of development quickened in, and adjacent to, the peripheral 'colonies' of forty years before, the littoral and the interior of the North Island became more sharply differentiated from each other.

Economic Geography

In 1881 New Zealand was still a youthful colony with a simple 'colonial' economy. This was evident in the significant role played by extensive pastoralism and a fertility-destroying arable agriculture, and evident also in the colony's continued dependence upon the wasteful exploitation of timber and mineral resources. On the other hand the development of manufacturing industry was limited and unpretentious. All this was reflected in the raw and untidy appearance of many a New Zealand landscape, in the inaccessibility of large parts of the country, especially in the North Island, and in the difficulties and hardships of backcountry pioneering.

Of the colony's sixty-six million acres, sixteen million had been sold or otherwise disposed of by 1881, and twelve million acres of Crown land were leased. But a smaller part of the country was actually occupied, and even of this area, most (including all the land held under depasturing leases) was very sparsely settled. There were still more than twenty million acres of virgin bush.[6] Less than a third of the total area —perhaps nineteen million acres—was the scene of some form of agricultural or pastoral occupance and production, and not more than 5,000,000 acres were 'in cultivation'.[7] The different classes of cultivated land were unequally distributed. In this respect the North and Middle Islands stood again in sharp contrast (Table I).

PASTORALISM

The colony's 13,000,000 sheep and 700,000 cattle were reared in the main on three kinds of pasture, and largely in three distinctive kinds of terrain. This varied pastureland was the basis of much of New Zealand's material prosperity and export trade. By far the most extensive, and for that reason still of prime geographic and economic significance, was the natural tussock grassland of the Middle Island, and the more restricted area of natural or induced grassland in the Wairarapa and Hawkes Bay. The tussock grassland of the plains and downland of Canterbury and North Otago had in the 1870's been ploughed up and replaced by a succession of arable crops. But in these two provinces there were still more than 9,000,000 acres of tussock grassland and rocky alpine summer grazing country held in 607 depasturing leases with an average size of more than 15,000 acres. This tussock-clad terain of deep glaciated valleys, broad fault basins and steep talus-streaked nountain flanks was the scene of highly-specialised extensive pastoralsm—a most efficient system of mass-producing fine wool (*Fig.* 1).

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[6] James Hector: *Handbook of New Zealand*, Wellington, 1879, p. 10.

[7] *Statistics of the Colony of New Zealand . . .* (*op. cit.*), pp. 209-218. 'In cultivation' is here used to include land in crops, land in grass after having been ploughed, land sown to English grasses but not ploughed, and land 'broken up' but not yet sown to grass or crops. Table V, p. 291 in *Results of a Census of the Colony of New Zealand, 3rd April 1881*, Wellington, 1882, reveals that 16,193,574 acres were 'fenced', an increase of forty percent over the corresponding figure for 1878.

The high country sheep runs, past and present, have been frequently lescribed.[8] In 1881 there were almost 100 flocks each of more than 20,000 sheep.[9] These huge backcountry flocks were Merinos (and nainly dry sheep) reared exclusively for their fine-woolled fleeces. The operating units ranged from 10,000 to 120,000 acres in size and carried at this time a higher density of stock than at any time since. They were in fact overstocked.[10] The deleterious effects of burning and over-

TABLE I

LAND IN CULTIVATION OR LEASED FOR PASTORAL PURPOSES 1882*

	Field Crops	Grass and Hay on Land Broken-up	Sown Grass on Land not Ploughed	Total Area under All Crops incl. Sown Grasses	Area held under Depasturing Leases
North Island	93,538 *9.2*	525,370 *29.5*	1,715,505 *79.2*	2,378,248 *46.1*	227,641 *1.9*
Middle Island	908,950 *90.8*	1,246,505 *70.5*	450,689 *20.8*	2,810,856 *53.9*	11,845,575 *98.1*

* Areas shown in acres. Figures in italics are percentage proportions of totals for the colony in each category. Data calculated from *Statistics of the Colony of New Zealand* . . . (*op. cit.*).

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[8] See for example L. G. D. Acland: *The Early Canterbury Runs,* Christchurch, 1951; R. M Burdon: *High Country, The Evolution of a New Zealand Sheep Station,* Christchurch, 1938; Lady Barker: *Station Life in New Zealand,* London, 1870; F. A. Weld: *Hints to Intending Sheep Farmers in New Zealand,* London, 1860; G. F. Fuller: *Five Years' Residence in New Zealand,* London, 1859; H. M. Thompson: *East of the Rock and Pillar,* Dunedin, 1949; W. H. Scotter: *Run, Estate and Farm,* Dunedin, 1948; and K. B. Cumberland: 'High Country Run: The Geography of Extensive Pastoralism in New Zealand', *Econ. Geog.,* Vol. 20, No. 3, July 1944, pp. 204-220.

[9] G. H. Scholefield: *New Zealand in Evolution,* London, 1909, p. 82.

[10] Today the tussock grasslands carry from 15 to 35 sheep per 100 acres, but in 1881 the Cottesbrook Station, east of the Rock and Pillar Range in Otago, carried 65,041 sheep on 116,938 acres. Thompson (*op. cit.*, pp. 20-22) quotes in full a 'valuation of Freeholds, Leaseholds, Buildings and Stock on Cottesbrook station', submitted to its owner on 3 June 1881. It showed the property consisted of five leaseholds totalling almost 110,000 acres and six separate freeholds ('eyes' 'spotted' out of the run) amounting to 7,438 acres. Half of the 55,325 Merino sheep were wethers and so were two-thirds of the 9,716 half-bred sheep. In addition, there were 147 head of cattle, 20 station hacks, four draught horses and eight young horses. Parts of three of the freeholds were cultivated and all were fenced. There were 90 miles of fencing on the 183 square miles of leasehold—21 miles of sodbank and 48 miles of wire. Apart from the 'big house' there were on the station, married men's cottages, single men's quarters ('Men's Bothy'), outlying shepherds' huts, cookhouse, mess, butcher's shop, smithy, sheepyards, woolshed (with stands for 24 itinerant shearers), washyards, dip and wool-scouring plant.

grazing by both sheep and rabbits, and the subsequent erosion of thin mountain soils by wind, frost and rain, had as yet become apparent only to the most observant.[11]

North Island Pastoral Farming

Extensive pastoralism and specialised, large-scale sheep runs in the North Island were less important. The runs were confined to the drier hill country east of the Wairarapa and in southern Hawkes Bay. But little of this was natural tussock land. The setting, the terrain and vegetative resources were different from those of the Middle Island high country. Here pasture had to be made, or induced, at the expense of both stock and stationholder out of a hilly wilderness of fern and scrub. It was in 1882 that Guthrie-Smith took delivery of Tutira's 61,140 acres, its fifteen by twelve feet weatherboard hut with clay fireplace and iron chimney, its 'illimitable wastes of fern', and its 7,000 Merino sheep—'skin and bone, scrags, their wool peeling off'.[12] Tutira, like its neighbours, was Maori land leased from an indeterminate number of owners, and only small parts of it had had English grass seed scattered on it.

Bushburn and Surface-sown Grass

In all, more than 2,000,000 acres in the colony had in 1881 been sown, though not ploughed (Table I); and most of these were in the North Island, where the acreage had been expanded from 970,000 to 1,715,000 in four years. This was to prove the most significant agricultural development of the time. It was a signpost to the future. Only after the termination of the Maori wars and the pacification of the 'disaffected' districts did the settler turn to the wet forested hill-country lands of the North Island. Bushburn techniques had not been perfected; but young men, unable to break into the 'squattocratic' holdings of the Middle Island, were moving north; the outer edge of the extensive bush-clad hills, especially from the Manawatu to beyond Waitara, were being given a fire-blackened, torn and tattered fringe; and long-woolled sheep and Hereford and Shorthorn cattle were being grazed on root

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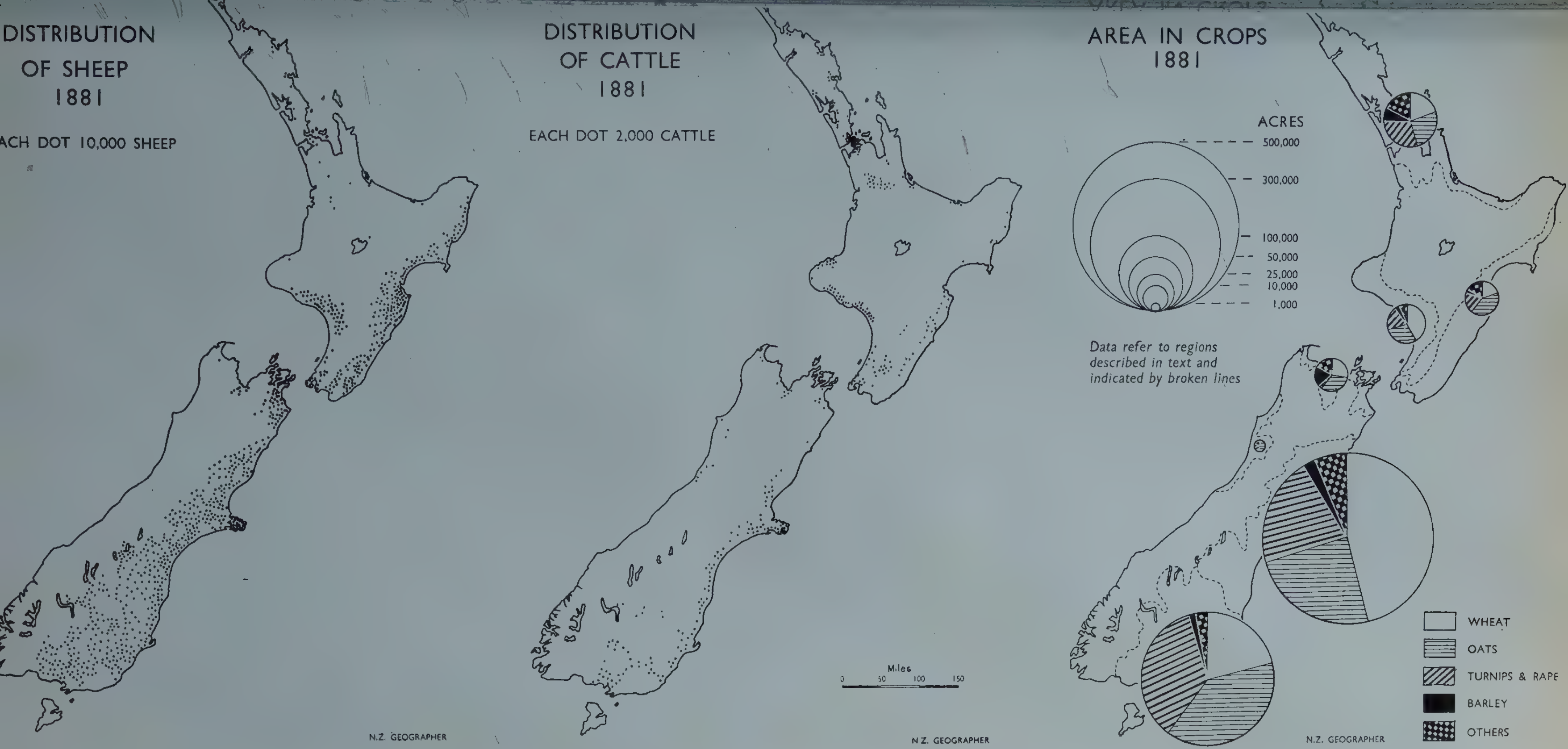
[11] J. Buchanan ('Sketch of the Botany of Otago', *Trans. & Proc. N.Z. Inst.,* Vol. 1, Pt. 3, 1869, p. 23) was an exception when he emphasised, with reference to the dry interior of Central Otago, that 'nothing can show greater ignorance of grass conservation than the repeated burning of the pasture in arid districts, which is so frequently practised. . . . Much of the grass land of Otago has been thus deteriorated since its occupation, by fire, and it is no wonder that many of the runs require eight acres to feed one sheep.' The history and outcome of burning in the Canterbury high country is reviewed in K. B. Cumberland: 'Burning Tussock Grassland: A Geographic Survey', *N.Z. Geographer,* Vol. 1, No. 2, October 1945, pp. 149-164.

[12] See H. Guthrie-Smith: *Tutira: The Story of a New Zealand Sheep Station,* Edinburgh, 1921, especially Chapter XVIII, pp. 147-161.



Figs. 1, 2 and 3. Sheep, cattle and cropland in New Zealand in 1881. The regions demarcated in *Fig.* 3 are described in the second part of this article.

crops and surface-sown grass grown amongst the gaunt, ghostly remnants of forest giants.[13]

The third category of pasture was that established on easy, gently-sloping land after ploughing and cropping. There were less than 2,000,000 acres of such productive swards of English grass and clover and they were mainly in the drier arable-farming areas of the Middle Island, half of them in six counties.[14] They supported a heavy livestock population mainly of long-woolled Leicester, Lincoln, Cotswold and Romney Marsh breeds and of the new Corriedale strain.[15] In the North Island—on the great estates in Piako, Waipa and Waikato counties for example—huge 'paddocks' ploughed out of pumice and fern and sown with grass and clover were used to support herds of Hereford beef cattle and often carried a beast to the acre[16] (*Fig.* 2).

Cropping

Perhaps the most spectacular aspect of colonial agriculture in the decade 1872-1881 was the expansion, progress, prosperity and mechanisation of arable agriculture, especially the growing of grain.[17] The golden grain, the golden fleece and gold itself contributed together all but a fraction of the colony's export wealth from the mid 1860's until the end of the century (*Fig.* 3), after which the grain and metal played a diminishing role in face of the rise of the meat and dairy industries. Whilst almost all the scattered North Island areas of settlement strove with mixed success to grow their own domestic grain, the bases of the export trade in the 1880's were the giant, bonanza estates and smaller wheat farms of the plains and downland of the eastern Middle Island. Canterbury alone grew two-thirds of the colony's wheat crop. Canterbury and Otago together had ninety percent of the acreage in oats and in turnips and rape.

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[13] 'After passing the gorge we . . . drove through the forest which was being cleared in many places, the burning trees, often blazing from the top only, looking very strange and weird in the fading light. It was dark when we arrived at Palmerston. . . .' S. Grant and J. S. Foster: *New Zealand: A Report on its Agricultural Conditions and Prospects,* London, 1881, p. 56. A further comment on p. 54 is also relevant: '. . . forest land when cleared is of excellent quality . . . [but] . . . we do not understand the cheapest and quickest way of clearing and cultivating forest land. A farmer from England can scarcely know much about this . . . [but] where there is any market for the wood, it might be a good investment for a man of small capital with a large family of grown-up sons able to wield the axe. . . .'

[14] Selwyn, Ashburton, Geraldine and Waimate in Canterbury, and Southland and Waitaki in Otago all had more than 100,000 acres.

[15] Stabilised in the 1870's in North Otago and South Canterbury as a new type inbred from half-breds produced by crossing Merinos with long-woolled breeds.

[16] Grant and Foster: *op. cit.,* pp. 10-15.

[17] Between the crop seasons 1872-1873 and 1881-1882 the acreage of grain crops expanded from 240,000 to almost 640,000 and that of 'other crops', mainly turnips and rape, from 18,000 to 280,000 (*Statistics of the Colony of New Zealand . . . (op. cit.)*).

The export crop was grown on holdings large and small under an extensive commercial system reminiscent of that of the Prairie Provinces.[18] The large-scale economy of the great estates, however, was more representative in 1881 than the more intensive production from smaller holdings which characterised the 1890's. Amongst the great estates those of the New Zealand and Australian Land Company, totalling in all 234,000 acres of freehold and nearly 350,000 acres of leasehold,[19] were typical, as well as those individually operated by Cameron (Springfield), Grigg (Longbeach) and Studholme (Te Waimate). At Longbeach nearly 5,000 acres were in crop in some years and as many as 300 hands were employed at the height of the harvest, and the accumulation of buildings housing animals, machines and employees was a township in itself.[20]

MECHANISATION

The two outstanding characteristics of the cropping system were the high degree of mechanisation and the extensive nature of land use and economy. Despite the immigration of the mid-1870's labour remained scarce and expensive. The colonial farmer thus took advantage of available mechanical aids. Large numbers of agricultural machines were imported from England and the United States, and New Zealand manufacturers were doing an expanding and profitable trade in Christchurch, Oamaru and Dunedin in supplying locally-designed ploughs, drills and reaping machines.[21]

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[18] In the season 1882-1883 production of wheat alone reached more than 10,000,000 bushels, from almost 400,000 acres. There were 78.7 acres of wheat per 100 persons. Exports reached a peak of more than 5,000,000 bushels in the following season. The average acreage of wheat in the last four crop seasons (1951-1952 to 1954-1955 inclusive) has been 107,000, or just over 5 acres per 100 persons.

[19] A. H. Clark: *The Invasion of New Zealand by People, Plants and Animals,* New Brunswick, 1949, p. 319.

[20] P. S. E. Hereford in *Cyclopaedia of New Zealand,* 1903, Vol. III, p. 801. An earlier account of Longbeach in Brett's *Auckland Almanac,* Auckland, 1880, p. 46, indicates the extent and many-sided activities of the estate: 'A large portion was originally flax swamp [on the seaward margin of the Canterbury Plains in Ashburton County] . . . such land is always very productive. Last year 3,000 acres were under grain alone . . . 1,400 acres were under mangolds and turnips, besides potatoes and rape. Three hundred acres were in field peas and nearly 300 acres mown for hay. . . . The horned stock numbered nearly 3,600 head, including a herd of magnificent Shorthorn cows . . . exclusive of dairy cows kept for the establishment. There is a grand flock of purebred Lincoln ewes numbering 1,800. They averaged 11 lbs. wool each. From 100 to 120 working horses are kept . . . the total number of horses is 400. From 2,000 to 3,000 pigs are usually kept on the farm, and about 1,000 will be converted into bacon this season. The machinery employed [includes] 15 self-acting reapers and binders, three combined threshing machines and scores of double and three furrow ploughs.' In addition there were 10,000 Merino and half-bred ewes (P. G. Stevens, *John Grigg of Longbeach,* Christchurch, 1952, pp. 30-31). 'There were stockyards for cattle and sheep and a boiling down works, for here, as all through New Zealand, a great number of sheep are boiled down for the sake of the tallow. There was a large flour mill, extensive sheds and stables . . . a bacon curing house and a tannery, a well arranged dairy . . . a shop, a post office, and a little church. The workmen lived chiefly in small moveable wooden houses, which could be drawn to any part of the estate . . . and in a separate house were all the necessary arrangements for cooking' (Grant and Foster: *op. cit.,* p. 34).

Many landowners leased part of their holdings to contract croppers either for rent or for a share of the crop. Much of the virgin tussock grassland was first broken in this way and ultimately put down to exotic grasses. In many cases grain crops were taken from the same land for as many as ten years in succession. In the crop season 1881-1882 the colony's average yield of wheat fell to twenty-two bushels an acre. This showed a decline of as much as twenty-five percent on average yields a decade before. The virgin fertility of the tussock soils was being appreciably reduced. In 1881 the country's leading agricultural journal issued a warning: 'We cannot expect to go on continuously in this way, as without manure our soil will in a few years become impoverished.'[22] English visitors noticed the strong contrast which New Zealand agriculture formed with the 'careful all-round system of English farming'. They commented on the widespread occurrence of thistles — thistledown blew across the streets of Christchurch 'like a snowstorm' and 'whitened gorse hedges'. They criticised the ploughing of hillsides in North Otago 'which in England we should scarcely think of attempting' and they found near Oamaru 'a good deal [of soil] that has been cropped out'. They also deemed it necessary to suggest to the colonial farmers the desirability 'of bestowing on the neatness of their farming a little of the attention which must now perforce be restricted to necessities'.[23]

EXTRACTIVE INDUSTRIES

Amongst New Zealand's fourteen leading exports in 1881 there were only four which were not agricultural or pastoral products. They were gold (second), kauri gum (fourth), rabbit skins (seventh) and timber (ninth). With coal, which was not exported, these comprise five interesting items in the economic geography of the colony of that time. Central Otago and Westland in the Middle Island and the northern peninsulas of the North Island had become established as the scenes of the destructively extractive production of gold, timber and kauri gum.

Gold mining in 1881 occupied 15,063 persons and of these Chinese numbered 3,430.[24] They operated mainly in Central Otago where heir patient industry and frugal living had enabled them to become uccessful 'gleaners of the fields' abandoned by Europeans. Gold mining ad become a 'settled industry'.[25] For a decade production had varied etween 250,000 and 500,000 ounces with a declining tendency. Almost alf this came from the scattered coastal settlements and remote forested valleys of Westland, and the rest from the goldfields in the frosty basins of Central Otago and from the Coromandel-Thames field in the north (*Fig.* 4). Gold winning was no longer the concern of the lone fossicker or of small parties of diggers. It had become an affair of companies with capital and machines. The wooden dredge, heavy sluices, crushers, stamp heads and steam engines had replaced pick, shovel and prospector's pan. Many diggings and shanty towns had already been abandoned. There were empty houses and barricaded shops in settlements which fifteen years earlier were boom towns; and all around them were silent piles of debris and wastes of rocky tailings.

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[21] Grant and Foster, *op. cit.*, p. 85, have interesting comments on the unsuitability of English-designed machinery and the special needs of the colonial farmer which in 1881 were being met most successfully by American and New Zealand manufacturers.

[22] *N.Z. Country Journal,* Vol. 5, No. 1, January 1881, p. 51.

[23] Grant and Foster, *op. cit.,* pp. 20, 35, 40, 43.

[24] 'Report on Goldfields', *Append. Journ. House of Repres.,* (H-13), Wellington, 1881, pp. 2 and 43.

The exploitation of the fossil resin of the kauri—kauri gum—had, in 1881, been established for many years. It was naturally restricted to the northern peninsulas to which area the growth of *Agathis australis* was restricted. Gum digging was often a part-time occupation of Europeans (including Austrians from Dalmatia) and an intermittent pursuit of Maoris. Living in tents or raupo whares, moving from field to field, wastefully clearing the land, often of valuable timber, to get at the buried nuggets of gum, and always leaving the landscape bare, blackened and riddled with holes, the gum diggers were often considered the riff-raff of the colony. In 1881, however, as more men turned to this activity with the onset of depression, the output of gum was rising and already contributed £254,000 to the value of exports. The industry was sufficiently important to the economy, and so effective in transforming the appearance of bush, raupo and manuka covered land, that it contributed markedly to the geographic personality of the peninsular areas tributary to the market centre and port of Auckland.

TIMBER

The destruction of the colony's forest wealth was in 1881 rapidly gathering momentum. The pacification of the Maoris left millions of acres of forested hill country in the North Island available for conversion into pasture land. Crown land, confiscated native land and land eased voluntarily by the Maori to the pakeha settler were all ripe for

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[5] John Bathgate: *New Zealand, its Resources and Prospects*, London, 1884, p. 60.

development. The more accessible margins of the forest, located mainly near the coasts, were being eaten into. Had bushburn techniques been perfected, the destruction would have been more marked than it was.[26]

Regret was, however, already being expressed at the inestimable value of the timber resources destroyed by fire. 'For how long, at the present rate of destruction, will forests remain with us . . . ?' asked a newspaper editor,[27] and a Waitemata county councillor claimed that 'within the last thirty-five years bush fires [had] destroyed not less than 340 millions of marketable kauri trees', and he asserted that the people of the Auckland province were 'deeply guilty of acting as if it [was] a matter of no consequence that [such] valuable property was being rapidly reduced to ashes.'[28]

Timber was cut and sawn for local use wherever it was available, but already the domestic hearths and joiners' shops of Christchurch, and even of Wellington and Dunedin, had become dependent on supplies of timber brought from a distance. It was the Auckland province that largely supplied both the colonial and overseas markets. Over ninety-seven percent of the value of exports of sawn timber, logs and spars, mainly of kauri, was shipped from North Auckland ports: Kaipara, Auckland, Whangaroa and Hokianga, in that order. Logs also were shipped or floated to Auckland from a number of mangrove-lined estuaries on both the North Auckland and Coromandel Peninsulas. Over 400,000,000 superficial feet of sawn timber were cut annually in the colony, quite apart from what was destroyed by fire. Of this, no more than three percent was exported. The bush, one of the country's most valuable natural resources, and hitherto one of its most characteristic features, revered and protected by the Maori for centuries, was now being hastily removed.

COAL

On the other hand, the colony's coal resources had barely been touched. Wood was still the universal domestic fuel. But with the lusty, youthful efforts of local manufacturing industries, the rapid replacement of sailing vessels by coal-burning steamers, and the frantic construction of railways, coal was by 1881 in firm and growing demand. In three years the quantity mined more than doubled and in 1881

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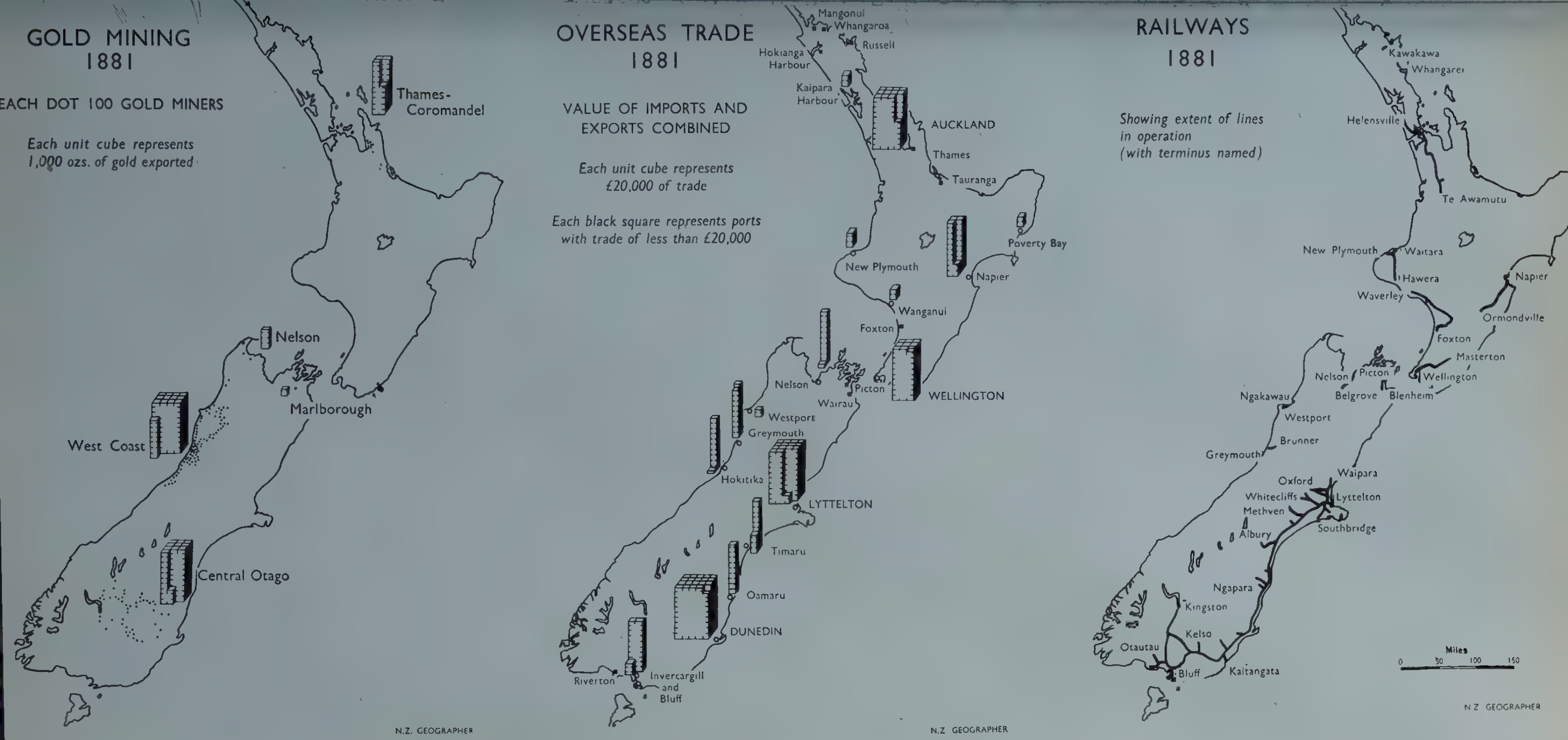
[26] The wholesale removal of the bush reached a peak in the following decades and especially between 1885 and 1910.

[27] *Auckland Weekly News*, 28 July 1881, p. 16.

[28] Richard Monk: *Our Forests and How to Conserve Them*, Auckland, 1886, p. 1.



Figs. 4, 5 and 6. Gold mining, overseas trade and railways in New Zealand in 1881.

reached 337,262 tons. Although imports fell, total and per capita consumption rose steadily. Coal mining was another extractive industry which was largely restricted either to Auckland, Westland or Otago. Pockets of coal near the coast were first exploited. The mine at Kawakawa had the largest output. Huntly and Taupiri were already in production, but in 1881, as today, Westland had most mines and the largest regional production. In Otago, Green Island, Shag Point and Kaitangata were the leading colliery districts. Coal mining employed 1,087 persons, or slightly less than were engaged in gum digging. It is indicative, however, of the important role in the economy still played by extractive industries that nearly eight percent of the employed population was engaged in mining, and another two percent in bush felling, fishing, flax cutting, rabbiting, pig hunting and gum digging.[29]

Rabbits

The rabbit pest and the attempts to control it were in 1881 of considerable geographic significance. Both houses of the legislature had committees investigating the problem and it was discussed frequently in parliament and in the newspapers. The rabbit was particularly the runholders' worry and its ravages were most evident in the extensive pastoral areas of Otago, Southland and the Wairarapa. This animal was blamed for a deterioration in the quality of wool (the inferior, weak-stapled product came to be called 'rabbity wool') and there was evidence that the close grazing of rabbits and their competition with sheep for available forage had reduced the weight of fleeces on some runs by two pounds.[30] One estimate claimed that the injury sustained to the country by rabbits was equivalent to the loss of 2,000,000 sheep or of £500,000 a year.[31] Runs were left unoccupied, leases not taken up, and the Prime Minister himself asserted that '500,000 acres of land . . . land which has hitherto been producing considerable rental and yielding a profitable return . . . was now virtually abandoned in consequence . . . of rabbits'.[32] Export of rabbit skins increased during the ten years 1872 to 1881 from 15,000 to 8,500,000! Farmers with smaller holdings had less difficulty in controlling the nuisance. The rapid expansion in numbers of rabbits was in large measure the result of the extensive system of land use. A number of runholders were indeed induced to cut up large estates and for this reason the rabbit was in some quarters looked upon as 'the people's friend'.[33]

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[29] *Results of a Census of the Colony of New Zealand* . . . (*op. cit.*), Table IV 'Details of Occupations . . .', pp. 247–257. In 1951 extractive industries of the same kind employed less than 2.3 percent of the employed population.

[30] 'Report of Rabbit Nuisance Committee', *Append. Journ. House of Repres.*, (I-6), Wellington, 1881, p. 8.

[31] *Parliamentary Debates*, Vol. 38, 1881, p. 172.

[32] *ibid.*, Vol. 37, 1880, p. 14. It is not without significance that the number of sheep in Otago *declined* by 494,000 between 1878 and 1881.

MANUFACTURING

The large investment of English and colonial capital in the previous decade had left its mark in the growth of the colony's manufacturing industries and in the expansion of urban occupations, but industry remained inferior to agriculture both in value of production and in number of employees. It also remained 'colonial' in character, small-scale in operation, dependent upon a local market and unprotected by tariffs. It was still very largely concerned with processing local primary products. It was protected from foreign competition only by the perishability and bulk of the raw materials it handled.

Flour milling, flax milling, timber working, wool scouring, fellmongering, soap and tallow making, meat preserving, brick making, stone working, printing, brewing and the small-scale manufacture of clothing and of boots and shoes—these were characteristic New Zealand industries. They were found in most towns of any size, although the towns of Canterbury and Otago had by far the largest number of industrial establishments. At this time a number of new wool-manufacturing, food-processing and engineering concerns were established in Dunedin and Christchurch or in smaller towns adjacent to them, and these were later to emerge amongst the really large industrial companies of the dominion in the phase of marked industrial expansion after the second World War. In 1881 the woollen and engineering industries, and especially the manufacture and repair of agricultural machinery, were exceptional in that amongst them were the few 'manufactories' in the colony which each employed more than a hundred persons.

Industrially the Middle Island was the more important. Whilst the manufacture of jam, cordials, aerated waters, beer and furniture, and printing and brewing and so on, were divided between the two islands approximately in proportion to their respective shares of the total population, the Middle Island had from two-thirds to three-quarters of the factories manufacturing agricultural machinery, of the wool-scouring and fellmongering establishments and of the grain mills. It had all the woollen mills.

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[33] Bathgate, *op. cit.*, p. 57.

In April 1881 there were 534,030 people in New Zealand including 44,097 Maoris and 5,004 Chinese.[34] This was fewer than five persons per square mile. Exclusive of Maoris, 60.62 percent of the population was in the Middle Island. Ten years earlier this proportion was somewhat greater—62.37 percent. The population was predominantly of British extraction; although, in view of the considerable minority of Maoris, and of recent Chinese, German and Scandinavian immigrants representing in all twelve percent of the total population, the people of the colony were less homogeneous in 1881 than at any time since.[35] On the other hand, nearly half the population was by this time New Zealand-born. The newness of the colony and its pioneering stage of development were reflected in the sex proportions and age characteristics of the people. Excluding Maoris and Chinese (all but nine Chinese were men), the proportion of females to males was still only 82 : 100, and fifty-three percent of the population was under twenty-one years of age.

Growth in the North Island

Table II illustrates statistically the rapid growth and the slowly changing distribution of the colony's population between 1871 and 1881. Figures 7 and 8 reveal the pattern of distribution in 1881 much more precisely. In a decade the population had almost doubled and, although the Middle Island was still the home of six out of ten, population was growing more rapidly in the north. All North Island provinces showed above-average growth in ten years, except Auckland, and in the three years after 1878, all excepting only Hawkes Bay. In the Middle Island only Canterbury's population kept pace in the 1870's with that of the colony as a whole, and the population of the 'golden coast' of Westland declined by 11.35 percent between 1878 and 1881. In the years 1874 to 1879 inclusive, net immigration accounted for an increase of 111,000 in the population, but in the intercensal period 1878-1881 both growth and changing distribution are essentially internal phenomena.

The maps (*Figs.* 7 and 8) show that the bulk of the people in the colony lived around the coasts of the two islands and that since 1853 there had been a linear spread of people from the original beachheads along the coasts, especially of Taranaki, Manawatu, Canterbury and

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[34] *Results of a Census of the Colony of New Zealand* . . . (*op. cit.*). It was forty years after the beginning of organised settlement that population reached half a million. The million mark was attained in December 1908 and two millions recorded in September 1952.

[35] There were 4,819 Germans, 2,199 Danes, 1,271 Norwegians and 1,264 Swedes.

Otago. Relatively few people had moved inland. The distinction between settled coastlands and empty interior was especially marked in the North Island. In the Middle Island the mining settlements of Central Otago and the pastoral occupance of the tussock lands had only slightly blurred the pattern of peripheral distribution of population. Queenstown was the only settlement with over 500 people more than fifty miles from the seaboard.

TABLE II

THE GROWTH AND DISTRIBUTION OF POPULATION BY PROVINCES*

	1871	1878	1881	Percentage Increase	
				1871-1881	1878-1881
Auckland	62,335	82,661	99,451	60.03	20.31
Taranaki	4,480	9,463	14,858	231.17	57.01
Wellington	24,001	51,069	61,371	155.74	20.17
Hawkes Bay	6,059	15,015	17,367	186.67	15.66
North Island	96,875 *37.63*	158,208 *38.09*	193,047 *38.38*	99.27	22.00
Marlborough	5,235	7,557	9,300	80.73	23.06
Nelson	22,501	25,128	26,075	15.88	3.77
Westland	15,357	16,932	15,010	–2.26	–11.35
Canterbury (incl. Chatham Is.)	46,934	92,118	112,424	139.36	22.07
Otago (incl. Southland)	69,491	114,469	134,077	92.80	17.13
Middle Island	159,518 *62.37*	256,204 *61.91*	296,886 *60.62*	86.08	16.49
New Zealand	256,393	414,412	489,933	91.09	18.22

*Exclusive of Maoris. Compiled from *Results of a Census of the Colony of New Zealand . . .* (*op. cit.*). Figures in italics show the percentage proportion of the total population.

Population was predominantly rural with only 38.26 percent living in settlements with more than a thousand people. The proportion of population living in towns, however, was growing steadily. Four of the capitals of the original colonies had in their progress and growth already left their rivals far behind. Dunedin, mainly because of the stimulus brought by discoveries of gold just twenty years before, was the colony's largest and most substantial urban unit. Dunedin with Port Chalmers (44,972), Christchurch with Lyttelton (34,842), Auckland (30,952) and Wellington (20,563) were already 'the four main centres'. Together they had almost thirty percent of the total population, excluding Maoris. No other town had more than 7,000 people.[36]

THE MAORI POPULATION

In 1881 the 'Native race', as the Maoris were still called, was in a state of decline and depression. Although the census of that year showed an increase of 279 in the number of Maoris, this was attributed to a more accurate assessment than had been possible in 1878. The late wars and the confiscation of land, following almost a century of combat with alien diseases and sixty years of intertribal strife, had finally weakened the spirit of the Maori. His extinction seemed inevitable.[37]

Of the 44,097 Maoris all but 2,061 were in the North Island. Most of them had retreated to the northern counties of the North Auckland Peninsula, the forested interior and the more distant parts of the east coast (*Fig.* 9). Their *kainga* were a collection of filthy, dilapidated hutments compared with the fortified, traditionally-constructed *pa* of forty years before. The Maori were outnumbered eleven to one by the pakeha, and the immigrant settler no longer depended significantly on the native people for labour, pigs, potatoes or firewood.

The Chinese were a quiet, sober, separate, but colourful and significant, element of the population of New Zealand in 1881. But for a whole session, parliament in that year debated, often in bitterly intolerant language, a bill designed to prevent further Chinese immigration. Of the 5,004 Chinese, 3,858 were employed in different phases of gold mining; almost 400 were market gardeners; more than a hundred were small shopkeepers, hawkers or pedlars; fifty-six were cooks on sheep stations or in mining camps; and fifty-three were rabbiters. A fifth of them resided in Westland, and three-fifths in Otago. Most of the rest lived in the towns or on market gardens near Auckland, in the Hutt

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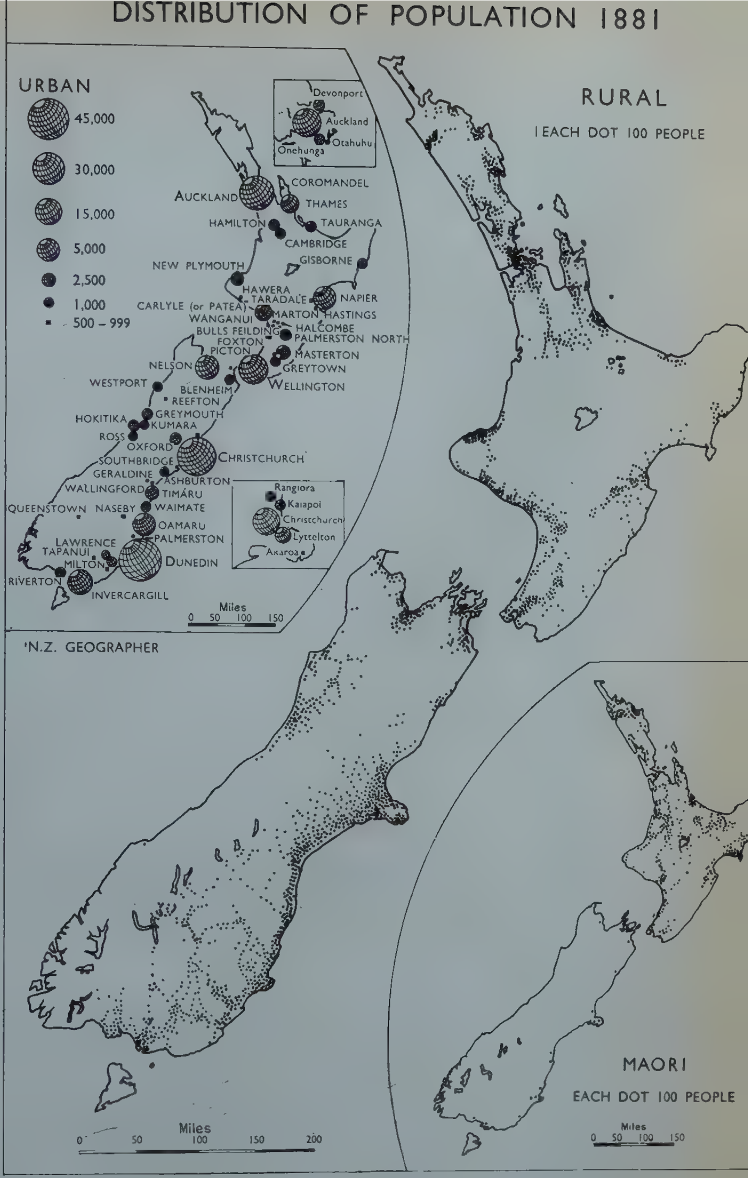
[36] In order, the ten next largest urban areas were (with their rank in 1951 in parentheses): Invercargill (8); Nelson (14); Oamaru (21); Napier (11); Thames (30); Wanganui (9); Timaru (13); New Plymouth (10); Hokitika (44); and Greymouth (19).

[37] 'It is the general opinion that the native race is on the decrease' (E. M. Bourke: *A Little History of New Zealand,* Auckland, 1881, p. 65). 'They [the Maoris] are fast either dying out or assimilating with the European element' (A. Claydon: *The English of the Pacific,* London, 1879, p. 21). 'The race is undoubtedly dying out very fast' (W. Coote: *Wanderings, South and East,* London, 1882, p. 47). 'I suppose, however, that the distress and overpopulation in Europe . . . will cause such an immigration as will certainly expunge the Maori people . . . therefore it is not worth while to speculate on any measures towards the perpetuation of their existence as a people which must be futile (*Maning Letters,* Vol. 4, Ms. in the Turnbull Library, Wellington).



Figs. 7, 8 and 9.
The population of New Zealand in 1881.

Valley, at Ross and Greymouth, and on the Taieri Plains. The humble Chinaman still trotted from place to place in the colony on foot, Indian file, in national dress with his bundle of worldly goods suspended from a pole on his shoulder. But for the other colonists transport had been revolutionised in a decade.

Transport

As late as 1871 there were in New Zealand only sixty-five miles of railway line divided into seven unconnected sections. Ten years later no less than 1,287 miles had been laid down and put into operation, and although this was in twelve sections, the Middle Island trunk line extended 425 unbroken miles from Waipara to the Bluff (*Fig.* 6).[38] Two-thirds of the railway mileage was, indeed, in the more populous and politically-powerful Middle Island; and, despite lower costs of construction on its gravel plains and through its greywacke hills, twice as much money had in the 1870's been spent on the railways of the Middle Island as on those of the North Island.[39] Although nothing was so effectively welding together the former turbulent little provinces and making of them a single nation as were the new railways, the lines of the North Island were still no more than fragmentary, isolated portions of a grand scheme. The line from Wellington extended only to Masterton in the Wairarapa and that from Auckland northwards no further than Helensville or southwards than Te Awamutu (*Fig.* 6). Almost thirty years were to pass before the gap across the deeply-dissected, weak-rock upland between the Waikato and the Taranaki-Manawatu lowlands was bridged.

Road travel beyond the limits of the bustling towns, and except on the straight, shingle roads of the Canterbury Plains, was still slow, hazardous and primitive. On the deep residual clays of the wet, forested districts of the North Island, and in steep hill country cut into Tertiary mudstones devoid of serviceable road metal, many a highway in the North Island—such as that from Gisborne to Opotiki—was no more than 'a sea of sticky mud [with] many bog holes, scrub overlapping and obscuring the track from the vision of both horses and riders; and fallen trees and landslips obstructing the path'.[40]

In 1881 the horse was universally used for conveying goods, whilst passenger stage-coach services linked the main settlements and even regularly crossed the Southern Alps between Christchurch and Greymouth. The wealthier families had American-type buggies or light carriages. Hansom cabs and horse-drawn omnibuses operated in the towns. Eight-horse teams hauled waggons in the rural districts, and in all but the more remote and difficult farming country horses pulled the farm machinery. Bullock teams were becoming rarer except in the North Island's deep mud, on back-country stations, where they hauled bales of wool, and in the timber-winning camps. But with the difficulties faced in moving heavy and bulky loads of goods in districts without railways, great reliance was still placed on coastal shipping services. They were indispensable in the system of internal transport, especially in linking the northern and southern parts of the North Island, in making trade possible between east and west in the Middle Island, and in interconnecting the two islands. To get to Auckland, passengers from other parts of the colony, even from Thames, Wellington, Napier or New Plymouth, went most of the way by sea, and on the east coast north of Napier and in North Auckland practically all communication between the scattered settlements was by coastal and river steamers.

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[38] The English mail via Brindisi and Suez was landed at the Bluff and sorted in a post-office van on the railway journey north (Bathgate: *op. cit.*, p. 83).

[39] *N.Z. Gazette,* 16 June 1881, p. 780.

[40] *Auckland Weekly News,* 7 January 1882, p. 20.

New Zealand ports in 1881 were busy places. In that year, for example, a total of 4,161 coastal and overseas vessels entered the Waitemata, and another 326 entered the Manukau to berth at Onehunga. The value of the colony's overseas trade reached over £13,500,000. Already two years earlier it had been claimed that New Zealand had a larger export trade per head of population than any other country.[41] To carry the cargo offering and to maintain essential external communications, adequate and efficient overseas shipping was of prime significance to New Zealand. Large shipping interests had already been established in the colony, and the government, realising the importance of shipping connections with the markets for the colony's swelling output of primary products, was not slow to subsidise overseas communications.[42] New Zealand was in most frequent touch by sea with the Australian colonies, but steamers of increasing size and tonnage linked the colony with Britain, now its largest market and always its chief source of supply. There was also 'direct trade with the Pacific Islands . . . the United States, China, Bengal, Singapore, the Mauritius, South American ports, Java, France . . . [and it appeared in 1881 to be] a mere question of time before steam . . . [would] swallow up the whole of the traffic carried on by sailing-ships'.[43]

A Land of Rich Promise

The mere forty years of organised settlement in the colony had been a period of continued progress and solid achievement. Firm foundations had been laid. Despite the hardships of pioneering in a new land, New Zealanders were already 'a community rich in this world's goods'.[44] A strange and compelling variety of contrasting environments was being rapidly subjugated and indigenous techniques were developed for this purpose. A decade of exceptional progress had been experienced, but in 1881 there came a world-wide economic recession which was to bring about in New Zealand a salutary steadying in the rate of development. It was also to afford the opportunity of reassessing the colony's natural resources and of marshalling available cultural resources before the next period of advance.

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[41] J. Barry: *New Zealand as a Field of Emigration*, London, 1879, p. 31. In 1881 the per capita value of exports and imports was almost £26 10s. The value of exports was 'greater than the combined value of exports of Queensland, Western Australia and Tasmania—all older colonies. That a handful of people . . . scarcely amounting in number to the population of a second-class English city, should be able in the thirty-eighth year of their existence as a colony to export produce of such value . . . is a fact without parallel.' (Bathgate: *op. cit.*, p. 24.)

[42] A good example of this was the 'San Francisco mail'. In 21 days, mail went by 'large and well-appointed steamers' to San Francisco and from there by railway and Atlantic steamer to London in another 18 days. Even today surface mail from London cannot be expected to take less time. Alternatively, mail went via Melbourne, Galle in Ceylon, Suez and Brindisi to London in 53 days.

[43] Bathgate: *op. cit.*, p. 70.

Land use was extensive, holdings too large and in too few hands. The colony's greatest problem was the perishability of the farm products it was so well equipped to supply—grain and wool excepted. Each year thousands of tons of meat were wasted when sheep were driven to the boiling-down works or driven over cliffs into the sea. Inestimable quantities of dairy produce could be furnished, especially from the new-won bush pastures of the North Island, if only it could be transported fresh to the underfed industrial communities of western Europe. Overseas visitors already realised that 'New Zealand ought to beat the world for dairy farming and [would] probably do so in the course of time'.[45]

There were already signs that technology would make this possible. In 1880 Queensland capitalists had successfully sent a refrigerated cargo of meat on the steamship *Strathleven* to London. New Zealand runholders and Middle Island estate companies had watched this experiment with bated breath and were now preparing to launch the first New Zealand experiment in shipping frozen mutton to Smithfield. On the outcome of that act of faith was to depend not only the future economy and progress of the colony, but the geography of the country as a whole and, above all, the hitherto undisputed ascendancy of the Middle Island.

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[44] *ibid.*, p. 66.

[45] J. C. Crawford: *Recollections of Travel in New Zealand and Australia*, London, 1880, p. 364.

NEW ZEALAND TOWNS AS SERVICE CENTRES

J. S. DUNCAN

A GEOGRAPHICAL stocktaking of the towns and cities of New Zealand would seem to be justified at the present time on at least two grounds. First, the population of the dominion is increasing so rapidly that it is expected to reach three millions in about twenty years' time. Recent trends suggest that nearly all the increase will be in the towns and cities, and a clearer understanding of the country's urban structure may help to solve some of the problems that are likely to arise from this rapid expansion. One problem implicit in this urban growth is rural depopulation, which is not a new problem for New Zealand, but is one which is going to demand more urgent attention in the future than it has received in the past. It is often alleged that the lack of services and amenities in rural areas, and the unattractiveness of many of the smaller country towns, are partly to blame for the drift of population into the larger cities and for the difficulty of obtaining farm labour. Here then is a second reason for examining New Zealand towns: the need to assess their efficiency as service centres, not only for those who live in them but also for those country folk who depend on them. The smaller country towns have an importance to the nation's economy and to its general welfare out of all proportion to their size. As long as New Zealand continues to depend for her export earnings on the products of the countryside, the development of her country towns into well-equipped service centres will remain a more urgent task than the proliferation of suburbs around her larger cities.

METHOD OF STUDY

A comprehensive survey of the provision of services of all kinds in all grades of urban centre would be a major undertaking. All that can be attempted here is a review of the provision of certain services that have been found, elsewhere, to be useful indices of the general standard of equipment in urban centres of various grades. The provision of each type of service is first examined in terms of six grades of town, ranked by size of population at the 1951 census. Combinations of index services are then used to group towns into five categories of service centre. At the higher levels ranking by size and by functional equipment is virtually identical, as might be expected, but amongst the smaller centres some interesting distinctions can be drawn between places that are well equipped and those that are not.

The ranking of urban centres by size of population follows a system used in the census tables,[1] but with certain modifications. For the larger cities and boroughs, the figures used are those for the urban areas defined by the Government Statistician and embracing all suburban boroughs and town districts as well as a fringe of county territory, largely but not wholly built-up. These suburban boroughs and town districts are not included in the lower categories. In the fifth category, towns with 1,000 to 2,499 people, five places are included that have no official urban status but which appear to warrant examination as service centres.[2] Two large townships, Mangakino and Roxburgh, have been excluded because of their possible temporary nature and their very specialised functions. In the very large group of places having fewer than a thousand inhabitants, those with the status of boroughs or town districts are greatly outnumbered by the townships. The latter win official recognition only from the Department of Census and Statistics, which draws a distinction between those places where there exists 'a fairly definite nucleus of a village'[3] and those that are mere 'localities' or the 'vicinities' of boroughs and townships. The smallest township listed, Parnassus, has only ninety-two inhabitants. The great majority of the 338 places having fewer than a thousand people have only the simplest functions as service centres, and few of them can show even one of the index services used in this study. On the other hand, in centres with over one thousand inhabitants, it is the absence of these services, rather than their presence, that is significant. All independent urban centres with populations of more than a thousand are shown on the map (*Fig.* 1) and the number of places in each size group, in each island and in the country as a whole, is shown in Table I.

Several significant facts are brought out by this table. First there are the wide gaps in size of population between the first and second and between the second and third ranks. That there should be ten centres within the fairly narrow compass of the second rank, with such marked gaps both above and below, suggests that these ten have much in common, both in their functions and in their national importance. The breaks between the lower ranks are the arbitrary divisions used by the Department of Census and Statistics, but they will be shown to approximate to significant changes in the functional importance of towns.

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[1] *Population Census 1951:* Vol. 1, *Increase and Location of Population,* Wellington, 1953, pp. 14-15.

[2] They are Reefton, Kaikoura, Tokoroa, Riwaka and Fairlie.

[3] *Population Census* (*op. cit.*), p. 64. The term 'township' carries no connotation of areal extent in New Zealand as it does, for example, in the United States. In New Zealand parlance it replaces the English word 'village' and the usage signifies an important difference between the settlement patterns of the two countries. In the simplest terms, the difference is that, in addition to its service functions, the English village acts as a dormitory for farm labourers; the New Zealand township does not.

TABLE I

DISTRIBUTION OF URBAN CENTRES BY SIZE OF POPULATION, 1951

Size Rank	Urban Centres	Population Range	North Island	South Island	New Zealand
I	Major Urban Areas*	90,000 to 330,000	2	2	4
II	Minor Urban Areas	19,000 to 34,000	7	3	10
III	Boroughs**	5,000 to 12,000	6	6	12
IV	Boroughs	2,500 to 4,999	20	4	24
V	Boroughs, Town Districts and Townships	1,000 to 2,499	30	20	50
VI	Boroughs, Town Districts and Townships	Under 1,000	189	149	338
	Total Urban Centres		254	184	438

* The Wellington and Hutt urban areas are treated here as a single conurbation.
** In this and lower ranks, boroughs, town districts and townships that fall within the boundaries of urban areas are excluded from the table.

The distribution of centres of each rank between the North and South Islands has some anomalous features. Roughly two-thirds of the population of the dominion lives in the North Island (67.74 percent at the 1951 census) but only in the second and fifth ranks are the urban centres distributed between the islands in similar proportions. Each island has two major urban areas[4] and six of the larger boroughs in the third rank. The multitude of small centres with fewer than a thousand people is also fairly evenly divided between the two islands. In the fourth rank the situation is strikingly different. Twenty boroughs out of the twenty-four with 2,500-4,999 inhabitants are in the North Island.

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[4] There are, however, twice as many people in Auckland and Wellington-Hutt as there are in Christchurch and Dunedin.

In explanation of these anomalies due weight must be given to historical factors, which largely account for the location of the four main centres, and to the specialised, atypical functions of such centres as Westport and Greymouth, the ports of the coalfields on the west coast of the South Island. The fact remains that the North Island is appreciably better equipped than the South Island with larger urban centres. It follows from the distribution of these places that a much greater area of the North Island is within easy reach of a large town or city than is the case in the South Island. Rural depopulation is much more widespread in the South Island than it is in the North Island and in general it is most serious in districts that are relatively remote from the larger towns. There would appear to be a connection between these facts. One link, probably not the only one, seems to lie in the quality of the larger towns as service centres.

INDEX SERVICES

The index services used here are trading banks, chain stores, hospitals, post-primary schools, cinemas and newspapers. These six services were used by Smailes[5] in his study of the towns and cities of England and Wales, and they are frequently used along with other services in studies of this kind in the United States.[6] They represent commercial, professional and social services of the kinds commonly found in towns but not normally provided in townships or in rural areas. They are usually found together, and where all six occur there can be no doubt about the town's status as a service centre. It has been necessary to relate the provision of all the services as far as possible to a common point of time, since changes occur frequently. The datum chosen was March-April, 1951, coinciding with the census of that year.[7]

Prior to 1951 there were six banking firms operating in New Zealand. In that year a merger of the Bank of Australasia and the Union Bank of Australia reduced the number to five, but for the purposes of this study two branches of the new Australia and New Zealand Bank in the same town have been counted as separate institutions. In the major urban areas most of the firms have several branches, serving suburban shopping areas as well as the city centre. This duplication is very rare in the smaller centres. Table II shows the distribution of centres in each size rank according to the number of banks they possess.

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[5] A. E. Smailes: 'The Urban Hierarchy in England and Wales', *Geography,* Vol. 29, No. 2, June 1944, pp. 41-51.

[6] See, for example, John E. Brush: 'The Hierarchy of Central Places in Southwestern Wisconsin', *Geog. Rev.,* Vol. 43, No. 3, July 1953, pp. 380-402.

[7] The following sources were used.—(i) Banks: Lists of branches kindly supplied by the banks. (ii) Hospitals: Department of Health: *Appendix to the Annual Report for the Year ended 31 March, 1951,* Wellington, 1952. (iii) Post-primary Schools: *Appendices to the Journal of the House of Representatives, 1952,* (E-2). (iv) Newspapers: Post and Telegraph Department: *List of Newspapers and Magazines placed on register at the General Post Office Wellington, C.1,* Wellington, 1949. (v) Cinemas and Stores: Universal Business Directories, Ltd.: *Trade Directories,* Auckland, 1948 to 1952, in nine regional volumes.

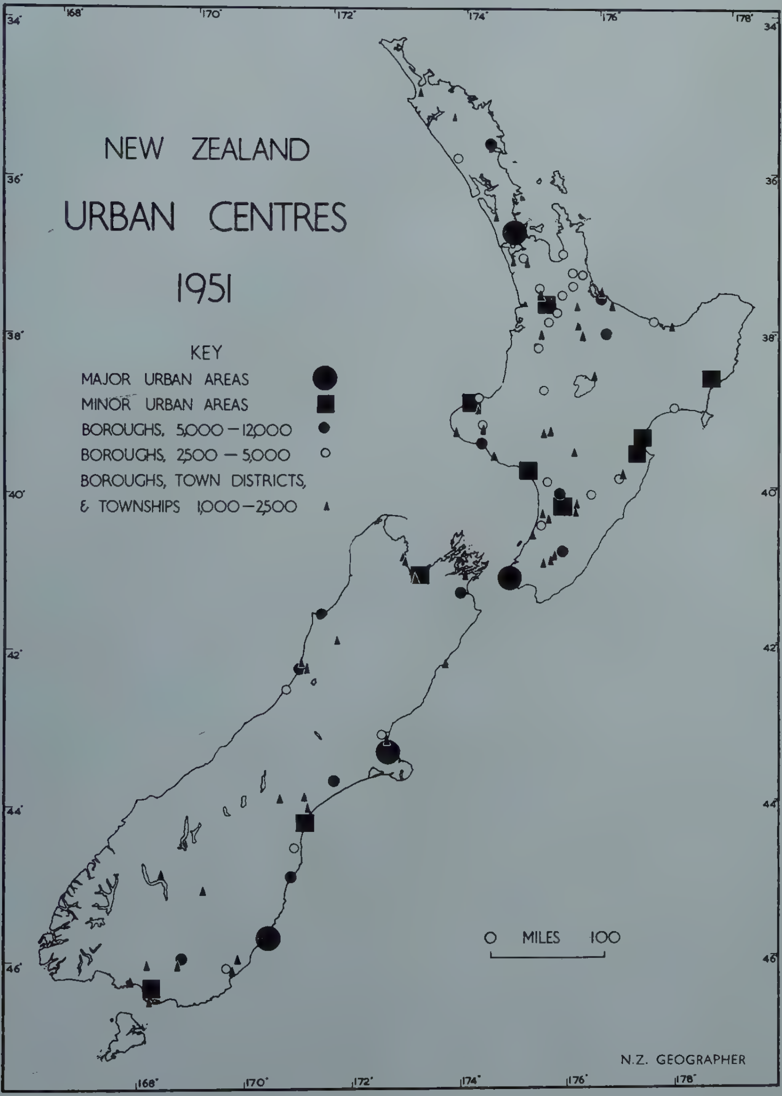

Fig. 1. The urban centres of New Zealand in 1951.

The significant feature of this distribution is that only four centres having more than 2,500 inhabitants have fewer than three banks, while only eleven smaller places have more than two. Of these eleven, eight enjoy a high level of provision of the other services under consideration. It would seem, therefore, that the presence of three or more banks in a town is a sign of importance as a service centre.

In some towns, however, notably in the mixed farming districts of the South Island, the banks appear to suffer from the competition of the stock and station agencies, which often assume the multiple roles of banker, wool broker, grain merchant, livestock auctioneer and general retailer for their farmer clients. Where branches of several of these firms are present, there simply may not be a profitable field of operations for three banks. This appears to be the case in Waimate and Rangiora, two of the four centres of the fourth rank with only two banks.[8] Stock and station agencies are less important and less numerous in the dairying districts of the North Island, and there are located nearly all the eleven smaller centres mentioned above.

Chain Stores

As an index of the retail services in a town the chain store has the merit of being a fairly standard unit, its organisation implying that a central authority decides in which towns to open branches. Unfortunately for present purposes, the establishment of branches in all suitable shopping centres by the three firms competing in this trade is not yet complete.[9] All twenty-six places in the first three size ranks are equipped with at least one of these stores, twenty-one of them having two or more. Only eight smaller centres had one in 1951, the smallest by far being Kaitaia (population, 1,800), which was also the smallest town with four banks.

Banks and chain stores, like cinemas and newspapers, are provided in towns because there exists a sufficient demand to sustain them at an economic level of working. Hospitals and schools, on the other hand, are frequently provided for social rather than economic reasons, the aim being to make them reasonably accessible to as many people as possible. Many of them were built to serve small communities that were relatively isolated in the days when transport was slow and often difficult.

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[8] The other two are Waihi and Huntly.

[9] Branches of Woolworth's, McKenzie's and MacDuff's have been taken as equal for index purposes. Two or three are normally found together but twelve centres in 1951 had only one chain represented. In his annual report for 1951-1952 the chairman of directors of the McKenzie chain spoke of plans for opening branches in Taumarunui, Te Awamutu, Whakatane and Takapuna. See *Official Record of N.Z. Stock Exchanges*, Vol. 22, No. 6, July 1952, p. 99.

The coming of the motor car and the improvements in road surfacing have reduced the need for some of the smaller schools and hospitals and have made it possible to consolidate schools by using fleets of school buses and to centralise some hospital services, especially in closely settled areas. Many small units remain, however.

HOSPITALS

The classification of hospitals used by the Department of Health has been followed here, and only public hospitals are dealt with. Six classes of general hospital are recognised, having respectively an average of more than 200, 100, 40, 20, 10 and fewer than 10 beds occupied daily. Classes IV, V and VI are essentially cottage hospitals and in Table III are grouped together, along with three small hospitals that also function as old people's homes. In larger centres, where several hospitals exist, often with specialised functions, the largest one has been taken as the index of provision. In many cases where a city hospital serves a wide area of surrounding country, maternity hospitals are provided in the smaller towns. They are usually quite small, with fewer than ten beds, but some are equipped to handle emergency general cases. With this service, and a large hospital within easy reach, a country town may not be thought deficient as a service centre simply because it has

TABLE II

INDEX SERVICES : BANKS

Size Rank and Urban Centres	Number of Banks							Total Centres
	Six or more	Five	Four	Three	Two	One	None	
I. Major Urban Areas	4	–	–	–	–	–	–	4
II. Minor Urban Areas	9	1	–	–	–	–	–	10
III. Centres with more than 5,000	4	7	–	1	–	–	–	12
IV. Centres with more than 2,500	2	3	4	11	4	–	–	24
V. Centres with more than 1,000	–	–	2	9	16	16	7	50
VI. Centres with less than 1,000	–	–	–	–	15	38	285	338
Totals, All Urban Centres	19	11	6	21	35	54	292	438

no general hospital of its own. The largest centre without any type of public hospital in 1951 was Levin (population 4,728)—an anomalous deficiency.

The three small centres shown in Table III as having class III hospitals are all in North Auckland, at Kaitaia, Kawakawa and Te Kopuru. The latter two are examples of institutions that have been retained in their original location in spite of a shift of population in the area they serve. If these hospitals were to be built today the logical sites for them would be in Kaikohe and Dargaville respectively. Neither of these latter places had even a maternity hospital in 1951, though each was several times the size of Kawakawa or Te Kopuru.

TABLE III

INDEX SERVICES : PUBLIC HOSPITALS

Size Rank and Urban Centres	Class of Hospital						Total Centres
	I	II	III	IV, V, VI*	Maternity	None	
I. Major Urban Areas	4	–	–	–	–	–	4
II. Minor Urban Areas	7	3	–	–	–	–	10
III. Centres with more than 5,000	–	5	6	–	1	–	12
IV. Centres with more than 2,500	–	–	10	2	6	6	24
V. Centres with more than 1,000	–	–	1	12	19	18	50
VI. Centres with less than 1,000	–	–	2	14	21	301	338
Totals, All Urban Centres	11	8	19	28	47	325	438

* Including three hospitals that are also old people's homes.

POST-PRIMARY SCHOOLS

The problem of providing post-primary education in country districts before the days of school buses was met by the creation of district high schools, in which a secondary department was added to an ordinary primary school, the whole being under the control of one headmaster. Today there are over one hundred district high schools, ranging in number of pupils from under twenty to over two hundred, about half of them having fewer than fifty on the roll of the upper school. Some of the smaller schools under the policy of consolidation have reverted to primary status, the upper classes having been transferred to another school; some of the larger have been promoted to independent status as post-primary schools. In the cities and larger towns occasionally technical schools may exist alongside the high schools. All technical schools and a number of high schools are co-educational, but in thirteen of the larger centres separate high schools exist for boys and girls. There is in practice no real difference between a mixed high school and the majority of technical schools, and in Table IV they are grouped together.

TABLE IV

INDEX SERVICES : STATE POST-PRIMARY SCHOOLS

Size Rank and Urban Centres	Provision of Post-primary Schools				Total Centres
	Separate High Schools*	Mixed High Schools**	District High Schools	None	
I. Major Urban Areas	4	–	–	–	4
II. Minor Urban Areas	7	3	–	–	10
III. Centres with more than 5,000	2	10	–	–	12
IV. Centres with more than 2,500	–	12	12	–	24
V. Centres with more than 1,000	–	3	28	19	50
VI. Centres with less than 1,000	–	–	56	282	338
Totals, All Urban Centres	13	28	96	301	438

* Eight urban areas have technical as well as high schools. In three others there are combined high and technical schools.

** Hamilton and Ashburton had both mixed high and mixed technical schools in 1951.

Besides the fifty-six district high schools in boroughs and townships with less than a thousand people, there are several in rural localities. It is clear, therefore, that the presence of a district high school in a town is not of itself a very reliable guide to the importance of the place as a service centre. On the other hand, the absence of any provision for post-primary education in nineteen centres in the fifth size rank must be regarded as a serious weakness. It is, in fact, symptomatic of a general lack of index services. Six of the nineteen have no bank and only three have more than one. Eleven have no hospital, five have maternity homes and only three have cottage hospitals. Only three have newspapers and several lack even a cinema. In a few cases—Eltham and Patea, for example—there is easy access to a post-primary school in a larger town nearby, and the absence of a district high school is no great disadvantage, but in general the deficiency can be taken as a useful negative index of the quality of the service centre.

Of the six services under examination the cinema is probably the most widely distributed, but information about the provision of cinemas in the smaller townships is rather unsatisfactory, and in Table V the sixth rank of urban centres is perforce omitted.

None of the other services discussed in this survey shows quite as strong a correlation between the size of town and the number or quality of the institutions in question as does the cinema. It may be that the area served by a cinema is of smaller radius than that served by a bank, a hospital or a newspaper, since a long journey is, for most people, a deterrent to going out in the evening. Most country folk visit a cinema only when other business brings them into town, as, for example, on sale day when the weekly or fortnightly livestock auction is held. On most nights, the cinema depends for its patrons on the townsfolk alone.

TABLE V

INDEX SERVICES : CINEMAS

Size Rank and Urban Centres	Number of Cinemas							Total Centres
	More than Five	Five	Four	Three	Two	One	None	
I. Major Urban Areas	4	–	–	–	–	–	–	4
II. Minor Urban Areas	–	2	7	–	1	–	–	10
III. Centres with more than 5,000	–	–	–	1	10	1	–	12
IV. Centres with more than 2,500	–	–	–	–	12	12	–	24
V. Centres with more than 1,000	–	–	–	–	4	40	6	50
Totals	4	2	7	1	27	53	6	100

NEWSPAPERS

Seventy-five urban centres in New Zealand publish newspapers, ranging in importance from the morning daily papers of the four main centres down to the weeklies, with circulations of under a thousand, published in some small country towns. Between these extremes there are places with evening, but not morning dailies, and others with journals that appear two or three times per week. The latter, like the smaller weeklies, concern themselves mainly with local news.

Many of the journals published in the smaller centres may be regarded as survivals from the past without belittling the importance of the part they play in focusing the life of their districts on the centres in which they are published. Fifty years ago, while the population of New Zealand was still less than a million, newspapers were being published in no fewer than 105 centres, and there were sixty-two dailies, twenty appearing in the morning and forty-two in the evening.[10] Before the advent of the radio and the motor car, these small-town journals performed an important service in distributing news that came in by telegraph. Today a radio is found in nine out of ten homes, and all but the most remote districts are served by morning newspapers published in the cities and distributed in the early hours by fast cars, special trains and aircraft. The number of daily papers has dropped to forty-three, of which ten are published in the morning and the rest in the evening.

TABLE VI

INDEX SERVICES : NEWSPAPERS

Size Rank and Urban Centres	Frequency of Publication				Total Centres
	Morning and Evening Dailies	Morning or Evening Daily	Once, Twice or Thrice Weekly	None	
I. Major Urban Areas	4	–	–	–	4
II. Minor Urban Areas	4	6	–	–	10
III. Centres with more than 5,000	1	10	–	1	12
IV. Centres with more than 2,500	–	8	12	4	24
V. Centres with more than 1,000	–	1	19	30	50
VI. Centres with less than 1,000	–	–	10	328	338
Totals, All Urban Centres	9	25	41	363	438

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[10] *N.Z. Official Year-Book, 1906*, pp. 87–93.

Because there is less time between printing and sale, an evening newspaper cannot readily be distributed over the wide area that can be served by a morning paper published in the same city. As a result, evening journals in the smaller centres have suffered less from the competition of their big city rivals than have the morning dailies.

Of the ten centres that have lost a morning newspaper since 1906, eight have retained an evening journal.[11] In several instances morning papers have changed over to evening publication, and of the twenty-five centres that now publish but one daily, Timaru alone has a morning newspaper. Most, but not all, of these places receive a metropolitan morning paper early enough for breakfast-time delivery. The smallest centre still publishing a morning daily is Greymouth (population, 8,862) on the west coast of the South Island. No town of comparable size is as remote from the influence of the cities, and it is significant that it is the only centre in the third size rank with both morning and evening newspapers. Moreover, Greymouth is the smallest centre with a local radio station. Evening dailies still survive in a number of small country towns, the smallest of all being Pahiatua with 2,096 inhabitants, but their continued existence must in some cases be ascribed to the inertia that delays adjustment to changing conditions. Many of the smaller newspapers appear less frequently than they once did.

Normal Provision of Services

It is now possible to summarise the information on the provision of the six index services by drawing up a table showing the normal provision in places of each rank.[12] The previous tables have shown that none of these six services is commonly found in townships of the lowest rank, which, therefore, is omitted from Table VII.

When the equipment of individual towns is compared with these yardsticks of normal provision variations either above or below the norm are found, of course, for each service. Large or consistent variations, however, are rare. In very few cases does the standard of provision of all six services equal or approach the norm for the rank above that to which the centre in question belongs. Almost as rare, in the higher ranks at least, is the town with services appreciably below the modal level for its group and nearer to that of the rank below. These exceptions are sufficiently numerous, however, to make it clear that there exists a hierarchy of service centres in which a town's rank depends not on mere size but on the quality of its provision of services. There is, of course, a fair measure of correspondence between this service hierarchy and ranking by size. It is convenient to distinguish between the ranks of this hierarchy by using different descriptive terms: in descending order of importance, major cities, minor cities, major towns, towns and minor towns.[13]

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[11] The other two are Reefton, which has now only a weekly where previously it had both morning and evening dailies; and Christchurch, which in 1906 was the only centre with two morning daily papers. One of these has survived, along with one of the two evening papers.

[12] In a study of this kind the use of the arithmetic mean would be inappropriate, even where feasible. Of the two alternatives, the mode has been preferred to the median, although in practice they give identical values for all but three of the cells in Table VII. The use of the median would avoid one of the three dual modes but would involve another in the fourth rank without removing the two already there.

TABLE VII

NORMAL PROVISION OF INDEX SERVICES

Size Rank and Urban Centres	Banks	Chain Stores	Class of Hospital	Post-primary Schools	Cinemas	Newspapers
I. Major Urban Areas	6 plus suburban branches	4 or more	I	Separate High Schools plus a Technical College	Many	Morning and Evening Dailies
II. Minor Urban Areas	6	2	I	Separate High Schools	4	Evening Daily
III. Centres with more than 5,000	5	2	III	Mixed High School	2	Evening Daily
IV. Centres with more than 2,500	3	–	III	District High School	2 or 1	Once, twice or thrice weekly
V. Centres with more than 1,000	2 or 1	–	Maternity	District High School	1	—

Before individual centres can be assigned to one or other of these categories—or rejected altogether—minimum standards of provision must be fixed for each rank. To adhere rigidly to the modal values set out in Table VII would be to attach undue importance to certain anomalies, as for example, in the provision of hospitals. Generally satisfactory results are obtained, however, if an allowance is made of a deficiency in respect of one, or, in special cases, of two index services. In those few instances where Table VII gives a double modal value, the lower one has been taken as critical. The hierarchy of service centres that emerges from this process of classification is shown in Figures 2 and 3. While there is a fairly close correspondence, in the upper ranks at least, with the size ranking shown in Figure 1, the exceptional cases of 'promotion' or 'demotion' are of some interest and will be discussed below.

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[13] The first four terms are used by Smailes (*op. cit.*) and the fifth replaces his term, 'sub-town.' The use of the word 'town' in this specialised sense may perhaps be excused, as such alternatives as 'ordinary regional centre' are too cumbersome by far.

MAJOR CITIES

All four major urban areas have strong claims to the rank of major city but these claims do not rest on their possession of a multiplicity of the six index services. Only their widely circulating morning newspapers are characteristic metropolitan services. Most of the other services are provided to meet the needs of the large urban populations, and, consequently, other types of institution must be sought to bring out the essential differences between the four major cities and all the lesser centres. Metropolitan functions are represented by university colleges, teachers' training colleges, stock exchanges and the head offices of firms that operate throughout New Zealand. The publishing trade,

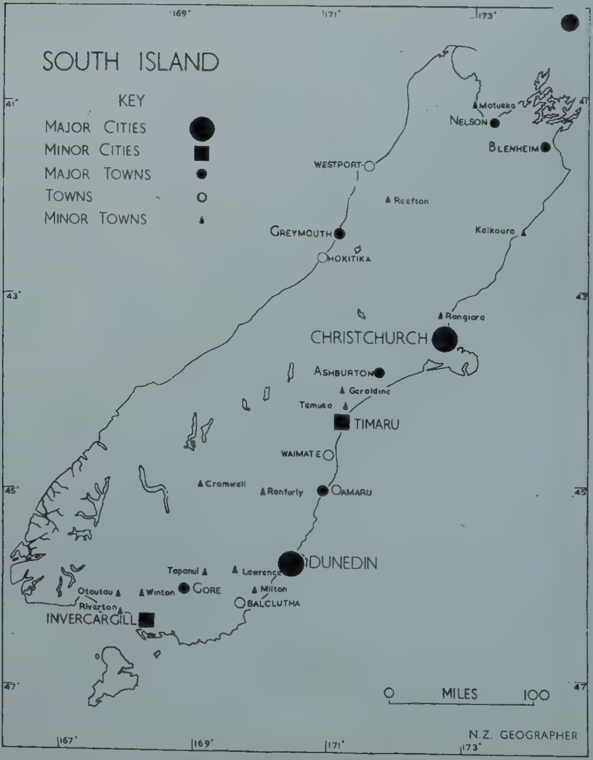

Fig. 2.
The urban hierarchy in the South Island, 1951.

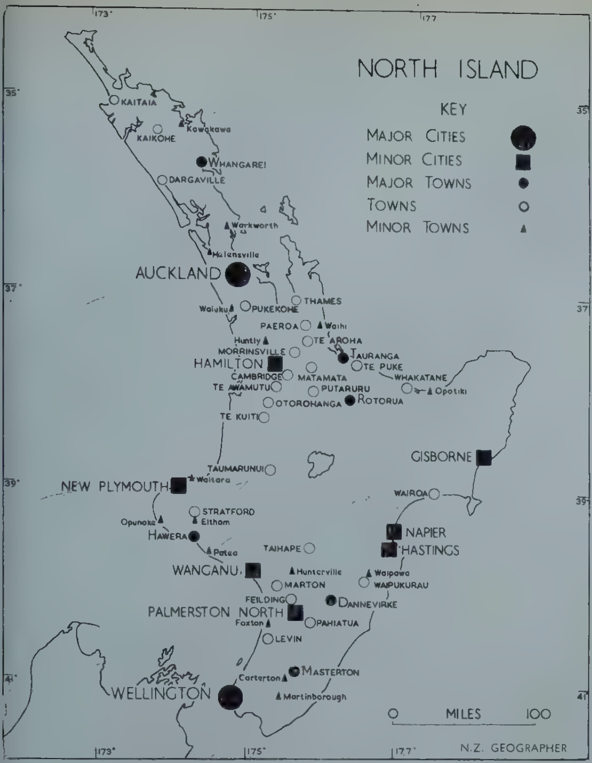

Fig. 3.
The urban hierarchy in the North Island, 1951.

with some exceptions, is confined to these cities. Each of them has three or four radio stations, whereas no other centre has more than one, and many other examples might be cited. In short, the preeminence of the four main centres and their approximate equality of status, if not of size, are generally-accepted facts of New Zealand life.

In fixing minimum levels of provision for the minor cities the index services appear to offer a useful basis for distinctions between centres of the second rank and the major towns of the third. It is expedient to allow two deficiencies from the modal level, as there are several variations, of no apparent significance, in the provision of hospitals and post-primary schools. Of the ten minor urban areas, only Nelson is deficient in respect of three services, and as its level of provision is almost identical with that of Whangarei and Oamaru, in the third rank, it has been classified as a major town rather than as a minor city. No third rank centre qualifies as a minor city.

Major Towns

The twelve centres of the third size group have between them only nine deficiencies from the normal equipment of index services. Five of these nine are shared by two centres, Feilding and Westport. Feilding lacks a general hospital, a newspaper of any kind and a second chain store, while Westport has only three banks and one chain store. If we allow only one deficiency for this rank, these two places must be 'demoted', but Dannevirke (population, 4,649) qualifies for promotion from the rank below. With the addition of Nelson, the number of major towns stands at twelve, six in the North Island and six in the South. Their status and functions are intermediate between those of the cities on the one hand and the ordinary country town on the other. Some serve small regions that are relatively remote from any city but which do not have a large enough population to support a fully-fledged city of their own. None of the twelve is nearer than thirty miles to a major or minor city or to another major town.

Towns of New Zealand

The typical array of services in centres of the fourth rank is less impressive than that of the rank above. Chain stores and daily newspapers are not normally found, and the post-primary school is often of the district high school type. It is significant, however, that the normal level of provision in this rank corresponds very closely to the standard fixed by Smailes as the minimum compatible with 'town' status in England and Wales.[14] Smailes, too, found it necessary to admit centres that fell below the critical values in one respect. A further concession of a second deficiency is made here where there is evidence of real importance as a retail and business centre in the form of a chain store and four or five banks. This affects only Feilding and Marton, which lack newspapers and have maternity but not general hospitals. Three other places in the fourth size rank, Huntly, Waitara and Rangiora, are found wanting on two counts without any such compensation in terms of services, while a fourth, Waihi, is deficient in three respects.

Eight centres with populations of less than 2,500 qualify for ranking as towns. In descending order of size, they are Taihape, Matamata, Pahiatua, Putaruru, Kaitaia, Kaikohe, Otorohanga and Te Puke. Te Puke had 1,457 inhabitants in 1951. All eight are in the North Island, so that the distribution of towns of the fourth rank of the service hierarchy is even more markedly in favour of the North Island than is that of places in the fourth size rank, noted above (Table I). Of twenty-nine towns only four, Westport, Hokitika, Waimate and Balclutha, are in the South Island. One reason for this apparent anomaly is suggested by another feature of the distribution of towns, namely that no fewer than twenty-one of the twenty-nine serve districts where dairy farming is the dominant rural economy. The close pattern of settlement in these areas appears to be particularly favourable to the development of well-equipped service centres, in that often from six to ten thousand people will live within an easy distance, say, a ten mile radius, of each centre. Conversely, areas where mixed farming is practised, with lower densities of rural population, are served by widely-spaced major towns and cities and by local centres too poorly equipped to qualify as towns.

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[14] Smailes, *op. cit.*, p. 44.

The Minor Towns

Many of these places belong to the fifth size rank and it seems desirable to distinguish a fifth category of service centres, which may be called minor towns, intermediate in status between towns and townships or service villages. The difficulty lies in fixing a standard for this rank. The normal level of provision in this size rank does not provide as useful a yardstick as do the norms for the higher ranks, because here the modal value is depressed by the presence in the group of a large number of poorly-equipped centres. To distinguish between these places and those that fall only a little below the requirements for ranking as towns, an arbitrary standard must be set rather higher than the group norm. The following level of provision would seem to be a reasonable requirement, given the same provisos as before about deficiencies: two banks, a cottage or maternity hospital, a district high school, a cinema and a weekly newspaper. Eight places have all five of these services and need only a third bank and/or a larger hospital to qualify as towns. Twenty others have four of the five, the service most frequently lacking being the newspaper. Two centres that are lacking two items have three banks as compensation, and seem to have a valid claim to rank as minor towns. They are Eltham and Patea. Their admission brings the total number of minor towns up to thirty, sixteen in the North Island and fourteen in the South Island. Surprisingly, only seventeen minor towns come from the fifth size rank, which numbers fifty centres in all. The remainder comprises the four places demoted from the rank above and nine centres with fewer than a thousand inhabitants, the smallest of all being Tapanui with only 434 people at the 1951 census.

This category of minor towns is not particularly satisfactory, but none of the alternative standards that were tried gave any better results. The minimum requirement adopted here excludes from the category of minor towns no fewer than twenty-five places with more than a thousand inhabitants. To lower the standards any further, in order to allow more of these places to qualify, would inevitably admit even larger numbers of smaller centres. An analysis of this residual group of twenty-five may help to explain their shortcomings as service centres.

Specialised Functions

A number of them have rather specialised functions, in contrast to the majority of towns and minor towns, which are primarily general service centres for farming districts. A study of representative cases suggests that the total population served by the shops and institutions of such a centre often exceeds ten thousand people and is rarely less than about five thousand. Some of these non-ranking townships, on the other hand, draw almost all their customers from within the boundaries of the borough or town district. The scale of provision of services for a population of less than, say, three thousand is naturally very much lower. Of the index services, a cinema and one bank are found in all but the most ill-equipped centres. With one other item, usually a maternity hospital or a district high school, these two make up the index equipment of all but a handful of these twenty-five non-ranking centres. The port of Bluff, the small manufacturing centres of Kaiapoi and Mataura, the beach resort of Mount Maunganui, and the new timber centre of Tokoroa all exemplify this specialisation and its concomitant poverty of urban services.

Effects of Competition

Another common feature is the effect on the development of small townships of the competition of larger, better equipped centres nearby. The lack of index services in such places as Ngaruawahia, Tuakau and Shannon may be largely ascribed to this cause. Others again lie between two or more important service centres and are, in effect, squeezed out by their more powerful neighbours. Inglewood and Woodville seem to have suffered this fate. The coalmining townships of Runanga, Brunner and Kaitangata, and the fruit-growing centres of Riwaka and Richmond appear to combine proximity to a good service centre with specialisation of function, and all five are remarkable for their lack of services.

Many instances could be given of this struggle for existence between neighbouring towns and townships. One further example must suffice.

Waimarino County, on the southwestern edge of the central volcanic plateau of the North Island, has a total population of just over 6,000, including two small boroughs, Ohakune (1,621) and Raetihi (1,153). This total is probably large enough to support a minor town. The requisite index services are present but are shared by the two boroughs so that neither of them can qualify on its own. The two places are only seven miles apart.

Suburban Boroughs

This survey has been concerned primarily with independent regional centres of various grades; suburban boroughs within the boundaries of the urban areas were deliberately excluded from the list of places investigated. Similarly, the Hutt Valley urban area was treated as part of the Wellington conurbation rather than as a separate entity.[15] The largest of these suburban centres are equipped with most of the index services defined, but the level of provision is appreciably below that of country boroughs of similar size. Measured against the yardsticks of provision used here to differentiate the five grades of service centre, they are not significant. Lower Hutt, with a larger population than any of the minor cities, ranks only as a major town. Petone and Otahuhu come within the size range of the major towns but rank only as towns; Mosgiel and Upper Hutt barely qualify as minor towns. This evidence helps to confirm that adduced for the non-ranking townships discussed above, particularly in respect of the size of urban population needed to support an adequate array of services where there is no rural clientele to speak of. In round figures, these estimates, for the second, third and fourth rank centres, are as follows: to support a minor city, approximately 50,000; for a major town, about 20,000 and for a town, perhaps 10,000. Similar estimates for the major cities or for the minor towns would not be very meaningful.

Application to Planning

If this study has a practical application, it would appear to lie in the field of town and country planning. If it is thought worthwhile to encourage the growth and development of country towns in order to improve the range and quality of urban services available to folk living in the surrounding districts, there is plenty of scope for action by various government departments. New schools, new hospitals and new branches of administrative offices should be located with these objects in view. Programmes of road and railway construction and of the building of state houses should be directed to these ends, as should official efforts to encourage the decentralisation of manufacturing industries. The centres chosen for such development should be at least twelve to fifteen miles from competing towns and even farther from cities. Where the existing density of the rural population is not high—say, less than sixteen persons per square mile—it would be especially important to ensure that the selected towns, when fully developed, were large enough to give a total regional population of at least ten thousand people.

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[15] 'The two areas in a sense form a single conurbation; and for some purposes it may still be convenient to use a combined figure [for population]'. (*New Zealand Official Year-Book, 1954*, p. 37.) The evidence of the index services, especially the absence of a local daily newspaper, lends support to the view that the Hutt Valley is still as much a suburban area of Wellington as the North Shore boroughs are suburban to Auckland..

NORTHWEST NELSON: ITS EMPTINESS AND ISOLATION*

A. J. ROSE

NORTHWEST NELSON is dominated by a massive highland interior. This, with its fringing hills, projects to the seacoast in two places and separates the discontinuous coastal lowlands from more populous and extensive lowland areas to the southeast and southwest. Further, a major break in settlement occurs where the breadth of the mountain complex forms an unroaded wilderness between the lowlands of Karamea and those about the shores of Golden Bay. The highlands themselves have a complicated pattern of relief forms which range from glacially-fretted ridgelines and gouged interior valleys through profound river-cut gorges to gentle upland surfaces, in places pitted and scored by the action of erosion on exposed limestone rocks. Although the higher ridgelines average about 5,000 feet in height, nowhere do summit elevations rise to more than 6,000 feet.

The lowlands comprise four major elements, usually distinct. There are coastal swamps and dunes; alluvial flats and low terraces; high terraces, commonly distinguished by their distinctive *pakihi* vegetation; and hills, dissected from relatively weak Tertiary rocks, which sometimes grade gently up to the highlands proper. These lower areas reach their maximum extension around the shores of Golden Bay and in the valleys leading south. About Karamea the flats and low terraces are restricted to a narrow coastal ribbon, but the hills of Tertiary rocks to the south form a broad and continuous belt of difficult country between the Little Wanganui and Mokihinui Rivers.

Throughout the region rainfall is sufficient for pasture growth at all seasons of the year. The only area not classified as superhumid[1] is the rather narrow eastern portion running south from Separation Point. Temperature is the limiting factor in plant growth and is responsible for one of the two notable divergences from the normal rainforest which formerly clothed the region. At altitudes usually varying between 3,700 and 4,100 feet, the tree vegetation gives way abruptly to subalpine meadow associations of tussocks and herbs. Garnier considers that this break of vegetation delimits the lower level of a distinct 'taiga' climate, although it is evident from field observations of the area that the precise position of the bushline is commonly dependent upon edaphic factors.[2] Ranging from the bushline down to the vicinity of 2,000 feet the forest was, and is, dominated by various species and hybrids of beeches (*Nothofagus*). Towards lower levels the beeches were progressively more strongly challenged by the podocarps and hardwoods of the subtropical rainforests which dominated the valleys and lowlands. It is possible that this change in associations is linked with the incidence of snowfall, which is relatively uncommon below 2,000 feet, and is distinctly rare on the valley floors and in coastal localities. But the economically desirable rainforest has now disappeared from all but the remoter hills. On the podsols of the higher terraces a further vegetation association occurs—the stunted and drably monotonous scrub and swamp of the *pakihi*.

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* Geographical studies have been made previously of two of the principal lowland areas of Northwest Nelson: in 1951 R. M. Stevens, *Karamea,* and in 1948 A. J. Rose, *The Takaka Valley,* both theses for the M.A. Degree of the University of New Zealand and both deposited in the library of Canterbury University College, Christchurch. A condensation of the latter work appeared in the *N.Z. Geographer*, Vol. 6, No. 2, October 1950, whilst a summary of the former appeared in the New Zealand Geographical Society's *Record,* No. 12, 1951.

[1] As defined by Thornthwaite: see B. J. Garnier (Ed.): *N.Z. Weather and Climate,* Special Publication of the N.Z. Geographical Society, Miscellaneous Series, No. 1, 1950, map p. 91.

An Outline of the Economic History

From its inception in 1842 the colony at Nelson formed the base for numerous exploration parties which vigorously traversed the west and north of the island. Later it acted as the principal centre from which the rest of Nelson and Marlborough was settled.

The spread of population in Northwest Nelson was slow and initially confined to the coastal areas about Golden Bay. But the process of settlement was greatly accelerated by the discovery of gold near Collingwood in 1857. This served not only to populate the more accessible interior localities but also stimulated agricultural expansion, particularly about Takaka. Improved communications and wider markets aided the development of the sawmilling industry which first rose to importance in the Takaka district, but which later spread westwards to the Aorere Valley, and thence to the shores of Westhaven Inlet. Simultaneously attempts were made to develop the coal seams which occur in the Tertiary beds and to exploit other mineral deposits. But success was only modest. In November 1874, a settlement was founded at Karamea, an area which had previously lacked a permanent population. By 1900 the eastern parts of the region were losing their pioneering character, and with ensuing progress, the Takaka Valley and parts of the Aorere Valley have become today 'mature' in the appearance of their settled landscapes. But this is not yet the case in the later-settled western areas, notably about Karamea and Westhaven Inlet, where the landscape still carries features which have disappeared from the east. This gradation of landscape is an arresting characteristic of the area.

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[2] For example, the floor of the Cobb Valley between 2,500 and 3,000 feet supports only scattered forest growth.

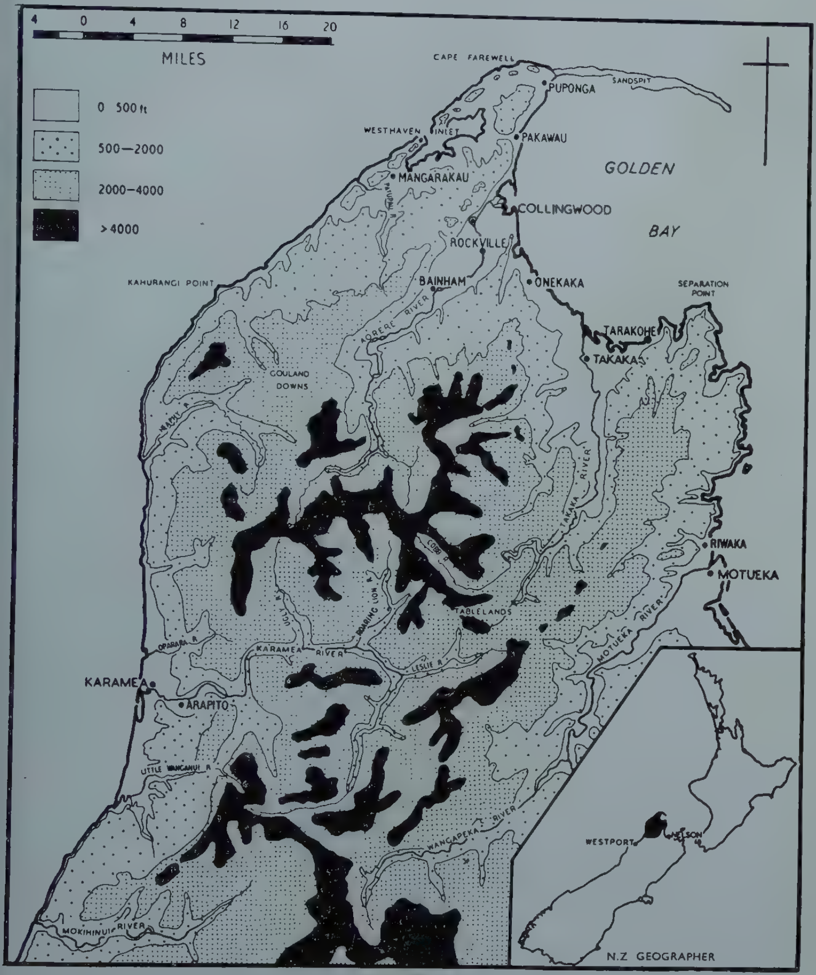

Fig. 1. Location map. Northwest Nelson occupies some 2,200 square miles, less than one tenth of which lies below 500 feet.

Physiography helps to delineate the division of the settled areas into four distinct subregions: Takaka Valley, Aorere Valley, Westhaven and Karamea. Each of these has its characteristic association of natural and man-made forms. In addition several areas of minor importance may be distinguished.

The Takaka Valley

Although the Takaka Valley is the most densely populated and extensive of the lowlands of Northwest Nelson, its area of eighty-six square miles represents less than one twentieth of that of the whole region. Yet in 1951 the local population of just over 2,000 was almost half the regional total, and the township of Takaka (590 in 1951) was clearly the largest commercial centre in the area. In contrast with the other settled areas, Takaka is blessed with moderately extensive and reasonably continuous good land, a climate somewhat more salubrious than is general in the region, better communication facilities with outside points, and a thriving manufacturing industry in the Golden Bay cement works which supports perhaps one fifth of the population. Dairy farming and sheep raising form the second, and more important, economic occupation, and, as the most extensive activity in the area, pastoralism is primarily responsible for the neat appearance of the land. Native forest has disappeared almost entirely from the valley floor while broad tracts of the enclosing mountain walls have also been cleared of bush. Grass has replaced forest trees, but shelterbelts and scattered exotic trees, both deciduous and evergreen, are relatively numerous. The whole aspect is that of a fully-used landscape with good roads and a relatively dense settlement uniformly spread except in the northeast where the presence of the township on one side, and the cement mill on the other, lead to concentration. The district is fortunate in that its sterile land, the *pakihi* and scrub, is confined to a single more or less continuous belt in the northwest and does not markedly disrupt the pattern of settlement.

The Aorere Valley

The lowland area of the Aorere Valley below 500 feet occupies some forty-one square miles along both banks of the lower seventeen miles of the Aorere River. The valley itself appears to occupy a fault angle lying between the dominating, much-faulted scarp of the Wakamarama Range to the northwest and the moderately-inclined lower slopes of the Haupiri Range to the southeast. Outstanding among the landscape features is the intricate system of terraces cut by the Aorere in the weak Tertiary rock series which occupies the floor of the fault angle. In some localities, notably near Rockville, the underlying hard limestone has been exposed, but river-planed terraces and alluvial flats comprise well over ninety percent of the area. The river flat and lowest terrace levels are best developed in the northeastern section of the valley between Rockville and Ferntown where the Aorere empties into the mudflat estuary of Ruataniwha Inlet. Inland from Rockville the flats are significant only around Bainham. Elsewhere the high terraces, which may be as much as 600 feet above the riverbed, are the principal landforms. Two miles inland from Bainham the valley floor narrows perceptibly, and from this constriction to the junction of Brown River, a distance of seven miles, maintains an average width of about only one mile. Upstream from this point the fault angle no longer exists and the Aorere flows in a steep-sided, sometimes gorge-like, course between forested mountains.

In general, the primitive vegetation of the valley conformed to the surface configuration, rainforest being confined to the less impoverished, recent soils of the lower levels, and *pakihi* being dominant on the higher terraces. However, in the upper part of the valley, where the rainfall exceeds 150 inches annually, even the higher levels supported forest, despite the infertility of the soil—so evident now that the land has been cleared. The ranges to the northwest still support a heavy forest cover, whilst the inclined upland surfaces to the southeast maintain only patches of woodland, scattered islands of tall vegetation amongst the prevailing scrub, and differing little in appearance from the growth encountered in this area by the goldseekers of 1857.[3]

Gold and Timber

The economic history of the Aorere district[4] is intimately interwoven with the exploitation of limited natural resources, particularly with gold mining and timber milling. After the first rush of 1857, gold was taken in relatively small quantities[5] for many years from the alluvial and diluvial deposits on the southeastern slopes and along the beaches of the

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[3] An interesting early description of the area is given in the *Nelson Examiner,* 11 April 1857.

[4] Two theses for the Degree of M.A. in History in the University of New Zealand summarise the story of settlement in Golden Bay up to the 1930's: W. J. Jefferies: *From Massacre to Golden Bay* (in the Alexander Turnbull Library, Wellington), and L. Bean: *Golden Bay* (in the library of Canterbury University College). Additional reports are available in successive numbers of the *Nelson Examiner* from February 1857, and in F. von Hochstetter: *New Zealand,* Stuttgart, 1867, pp. 99 and 104-107.

[5] The total amount of gold produced in the Northwest Nelson fields and passing through the Nelson Customshouse between 1857 and 1886 was 224,077 oz., valued at £890,662, or a little more than two percent of the New Zealand total to that date (*Handbook of N.Z. Mines,* Wellington, 1887). A quarter of this was won between 1857 and 1863. The Northwest Nelson goldfield included all the region under consideration except the Karamea district which was grouped with Buller.

Aorere River itself. Minor quantities only were found northwest of the river. Collingwood, which as port for the goldfields in 1857 threatened to rival Nelson as chief town in the province, had only 192 inhabitants in 1878. Its population varied with the fortunes of the goldfields, sometimes increasing as claims became temporarily more profitable when worked by parties of miners with greater capital backing. But by the turn of the century sawmilling and dairying on the riverflats were becoming more important than alluvial mining among the hills. In 1907, forty-one men were employed in alluvial mining in the whole of Collingwood County,[6] while during the previous year five sawmills produced from the valley floor 1,150,000 feet of timber, sixty-nine percent of which was rimu, and nineteen percent kahikatea.[7] At the same time dairy factories were operating at Rockville and Bainham, a reflection of the rise of pastoral farming and the improvement of communications along the valley.[8] Improved transport facilities favoured the consolidation of the district's dairy industry and today all butter is processed at the cooperative factory at Rockville. Two sawmills, at Bainham and Rockville, continue to produce more than sufficient timber for the district, small quantities being sent by road to Takaka and Nelson.

CONTRASTING LANDSCAPES

Today the Aorere Valley is characterised by two contrasting landscape types—tracts of dismal swampy or scrubby *pakihi,* and alluvial flats cleared of forest and devoted to dairying. The dairying areas, green throughout the year, are situated in three distinct localities separated by expanses of *pakihi.* The most important of these farming centres is that around Rockville and the lower Kaituna River. Here dairy farms line the roads, barberry hedges form a neat crisscross pattern, and the forest has been removed. Hummocky land which is never ploughed is present near the river where the frequent floods would strip away exposed cultivated soil, but even these areas support good pasture growth. The loosely-integrated centre of Rockville is split in two by the river, but the presence of the dairy factory emphasises the relative importance of Rockville as a centre for the district as a whole.

The Ferntown locality at the mouth of the river is essentially deltaic. Its pasture lands are seamed by tree-lined water courses which impart something of a gallery-forest aspect to this most fertile part of the Aorere Valley. The commercial centre of Collingwood is close at hand. By contrast Bainham lies well inland, some twelve miles from Collingwood, and is cut off from direct communication with Rockville by high terraces in the centre of the valley. The connecting road skirts these terraces on the west, traversing a low gap between them and the still-forested Wakamarama scarp. Hummocky ground, patches of fern, logs and rotting stumps, together with the low proportion of first-class improved land, indicate that the production potential of this area has not yet been reached. Many farmers still fossick for gold during the winter months. Farther up the valley the land becomes progressively more wild, and river, forest and mountains combine in a spectacular and primitive landscape of contrasted blue, white and green.

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[6] *Append. Journ. House of Repres.,* C-2, 1907, p. 17, Table 11.
[7] *Ibid.,* C-4, 'Schedule of Sawmills', p. 38.
[8] Bean: *op. cit.,* pp. 82-84 and 90.

PROBLEMS OF ISOLATION

Collingwood County is characterised by a large area with poorly distributed good land. In 1946 only 29,800 acres or some eight percent of its total area of 562 square miles was agriculturally improved. A further 114,188 acres (or thirty-two percent) were occupied but unimproved, and of the improved land, probably not less than half lies within the valley. Together with the town of Collingwood, this valley area supports almost two-thirds of the country population of 1,013. Yet even within this comparatively favoured area the people are very unevenly spread, large tracts of uninhabited land alternating with restricted areas of moderately dense settlement. The financial burden imposed on the community by this exaggerated dispersion is reflected particularly by the rough state of the roads, even in the valley itself where quantities of excellent road gravel are available.

The financial burden is further accentuated by the isolated position of Collingwood. The prime reason for the existence of this commercial centre has lain in its historical function as a port and outlet for the produce of the district. It no longer serves this function owing to the silting of its harbour. The few shops and houses huddled on the mud-flat-girt spit at the mouth of the Aorere seem doomed to eventual disappearance.[9] As a business centre for the valley Rockville is more suitably situated. A study of the changing relative importance of these two centres would apparently illustrate the gradual domination of site suitability over historical momentum as a factor in maintaining commercial primacy in a developing small area.

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[9] This site was used by the Maori as a camping ground at certain seasons; apparently it never supported a permanent settlement before 1857.

NORTH CAPE - WESTHAVEN

To the north of Ferntown stretches a ribbon of lowland narrowly confined between the waters of Golden Bay to the east and the scarp inland. The road following this plain forks upon reaching Pakawau Inlet. One branch continues north to Puponga and Farewell Spit, the other swings west through the Pakawau Gorge, the abrupt northern termination of the Wakamarama block, and thence along the indented eastern shore of Westhaven Inlet, around the Mangarakau swamp and along the lower Paturau River to its mouth on the west coast. The area tapped by these roads constitutes the third subregion of Northwest Nelson. Extending for thirty-two miles southwest between Cape Farewell and Kahurangi Point this area may be termed the Westhaven district, after its central portion, although locally several distinct districts may be recognised.

Coal was the first attraction which drew Europeans to the area.[10] Its exploitation has remained an abiding interest of the inhabitants. As early as 1841 some coal had been lifted from the outcropping seams on the mudflat near the entrance of the inlet,[11] and thereafter exploitation continued intermittently. Other seams were discovered and opened up, notably near Pakawau, but none of these enterprises was successful. Two mines, the Puponga and North Cape, were opened in the far north in 1905 and 1911 respectively. These are now defunct although the former produced 225,254 tons between 1905 and 1921, and the latter 95,396 tons between 1911 and 1921.[12] During and since the second World War a small output has been maintained from seams south of the inlet.

Gold also played a part in the history of the district. A small but rich field in the alluvium of several creeks to the south of the Paturau

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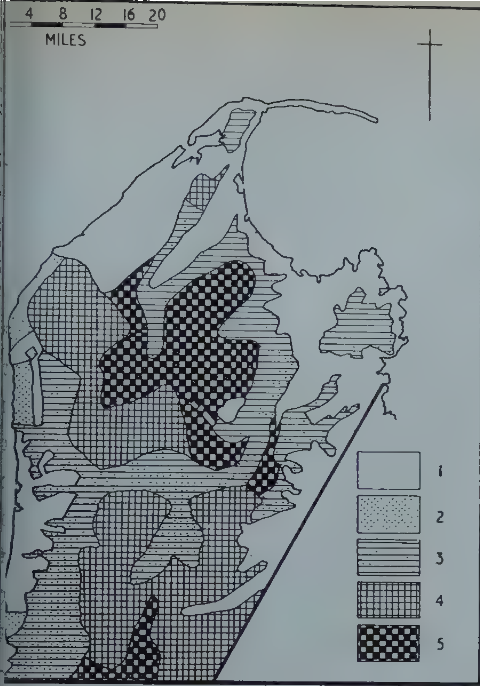
[10] The geology and mineral deposits of the area have been examined by a long succession of geologists, among the earliest of whom were von Hochstetter and von Haast. (See *Reports* of the N.Z. Geological Survey, 1866 *et seq.*) In 1923 a bulletin was published dealing with the geology of this and the adjoining areas. (See M. Ongley and E. O. Macpherson: 'The Collingwood Subdivision', *N.Z. Geol. Survey Bull. No. 25,* (N.S.) 1923.) These reports are also useful as the principal source of material dealing with the area's historical development which has been closely connected with mineral exploitation.

[11] *Nelson Examiner,* 16 April 1842. In this article Tuckett also mentions that one Rolphe, a shipwright on the Aorere, used Pakawau coal for his forge.

[12] Ongley and Macpherson: *op. cit.,* p. 34.



g. 2a. Potential settlement pattern, 1907.*

1. Lands already alienated or occupied.
2. Land suitable for close settlement.
3. Land suitable for pastoral purposes.
4. Land for forest and scenic reserves.
5. Barren mountain land.

(Categories 2 to 5 were unused.)

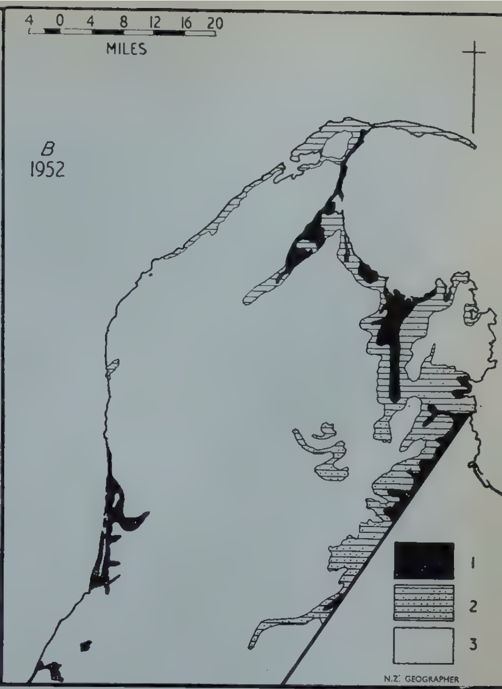


Fig. 2b. Settlement pattern in 1952.

1. Land held in small or moderate-sized holdings, and relatively densely settled.
2. Land used for extensive pastoral purposes—holdings of more than 1,500 acres, and few inhabitants.
3. Unused land—forest and mountain land.

*Based on *Append. Journ. House of Repres.*, (C-1), 1907, p. 28.

These maps demonstrate that the estimates of 1907 were overoptimistic, and that the frontier of effectively-occupied land even in 1952 had failed to reach the limits of land alienated 45 years before.

flourished briefly in the years after 1868.[13] In this area too, several small lodes were worked, with but only moderate success before the entire area—85,000 acres reaching from the inlet to Kahurangi Point—was consolidated under the ownership of an English company in 1895. This parent company was unsuccessful, obtaining only small returns from the several leads it developed, but a subsidiary company had better fortune, opening after 1898 a reef which, until it was worked out in 1914, produced officially 26,939 oz. of gold. Thoughts of gold seem now to have disappeared from the consciousness of the local population, a rather unusual feature for residents of Northwest Nelson.

The subtropical rainforest has been cleared from all the coastal margins of the district to a distance seldom exceeding two miles from the sea. This process has been long drawn out, having commenced at least as early as 1852.[14] By 1920 cleared patches of land extended southwards along the coast to Kahurangi Point, but owing to difficulties of transport most of the timber on the cleared land was destroyed rather than milled. Only around the southern shores of Westhaven Inlet has milling been successful. The present Mangarakau mill, the latest of a long succession of ventures, ships its sawn timber from a nearby jetty. Some miles away another timber concession is being worked, the logs moving by lorry to a mill at Pakawau, the location of which on the sheltered tidewater of Golden Bay gives it a marked advantage.

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[13] J. Park: 'West Wanganui Coalfield', *N.Z. Reports of Geol Explor. 1888-1889*, pp. 57 and 58.

SIGNIFICANCE OF PASTORAL FARMING

At present the long-standing problems of the Westhaven district—those of poor transport facilities and of unlimited optimism coupled with strictly limited resources—seem to be nearing solution. Production of wool, fat lambs and beef cattle from the coastal runs provides a steady livelihood for the pastoralists; ready markets are available for such timber and coal as is forthcoming from the mills and mines. None of this would be possible without roads. Not until the construction boom which followed the economic depression of the 'thirties was the muddy route across the tidal flat from Mangarakau to Pakawau replaced by an all-weather road, which became known locally as the 'dry road'. Even today the few settlers south of the Paturau must wait for the tides before proceeding along the beach, their only route to the outside world. And even the 'dry road' is fit for little other than heavy motor transport. In this respect those who live north of Pakawau are more fortunate, but even they have to cover a hundred miles of winding road to Nelson.

The livestock of the area, reared on holdings of up to 2,000 acres, are usually healthy animals. Sheep are found throughout the cleared areas, but some of the properties, particularly in the north, concentrate on cattle breeding. Markets for this livestock are located farther east, the Westhaven district being a major source of supply for Nelson. The bulk of the trade appears to be in the hands of dealers from the Takaka Valley where the livestock is commonly held in fattening pastures before being consigned finally to the consumers. Thus the relations of Takaka with this district are comparable with, say, those between the Manawatu and its inland breeding country.

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[14] Quoting from James Mackay's *Narrative of the Opening of the Hauraki District for Goldmining,* 1896, p. 17, Ongley and Macpherson cite the granting of a pasturage licence at Cape Farewell in 1852. The electoral roll published in the *Nelson Examiner,* 9 July 1853, includes 'James Mackay, sheepfarmer, Massacre Bay'.

KARAMEA

Karamea may be reached from Golden Bay by following the track which leads across the Gouland Downs inland from Bainham. This requires a walk of at least three days. It is easier and more conventional to travel the 200-mile long, circuitous road route down the Buller Gorge and to approach Karamea from the south by way of Westport. Thus Karamea is physically isolated from Golden Bay and indeed from Nelson, the provincial capital. Yet it was from Nelson that the district was settled, and the present-day economy of the area is more akin to that of Golden Bay than the more accessible Buller district to the south.

In the initial settlement of Karamea unskilled human effort was pitted against a difficult environment.[15] The turbulent Karamea River, hurrying from its gorge, swings once or twice against a narrow flood plain before emptying into the sea by way of a bar-bound estuary. This estuary provided the harbour for the settlement. Both north and south for a total distance of twenty miles extends a narrow band of sand dunes, and behind this barrier the swamps, lagoons and estuaries have been partially filled by the material brought down by the Karamea and smaller streams. Backing this watery stretch is a discontinuous cliff face, evidently the product of wave action trimming the higher terraces which form the third element in a longitudinally disposed landscape. These terraces are most extensively developed to the south of the river, and several streams such as the Little Wanganui and Granite Creek, notching deep below the general level, have etched out small flood plains in the weak Tertiary sediments. Where the water courses are closely spaced the terrace system has been dissected to form steep-sided hills which rise gradually inland. Six to ten miles from the coast this country suddenly ends against the abrupt flanks of the granite mountains of the interior.

Apart from the swamps and the extreme seaward edge of the dunes, the land was originally densely forested. Maori settlement in the area had been sporadic, and apparently no extensive agricultural clearings had been made by them before the first European explorers reported on the area in 1846.[16] Heaphy's original estimate of 'about eighty square miles of good level land' was reduced by later explorers. Von Haast[17] noted 'some 25,000 acres of fine, level forest land' and recommended the southern bank of the Karamea as a favourable site for a township. The prospects for settlement in the district were sufficient to attract speculators in Nelson, who alienated, but did not occupy, much of the best land during 1867.[18] The Provincial Council of Nelson then sponsored a scheme to settle immigrants at Karamea, and the first of these arrived on a 4,000-acre block south of the river in November 1874. After the first years the little colony was administered by the newly-created central government in Wellington.

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[15] There is a paucity of documentary material dealing with the settlement and subsequent development of Karamea. Occasional references in government reports constitute the bulk of the material. The people themselves are singularly disinterested in the history of their district.

The Legacy of Inexperience

A number of factors prevented the early success of the settlement, not the least of which was the background of the settlers themselves. Many of them were drawn from the industrial cities of the English Midlands and all were totally lacking in colonial experience. The thick forest, alienation of the most desirable land, and the exceedingly intractable soil among the boulders of South Terrace, where the first settlement was made, further inhibited early prosperity. Small parties of gold seekers operating along the beaches and creeks could offer little assistance, and public works were not forthcoming.[19] Gradually, however, the settlers moved across the river to the more attractive north bank, and in 1878 there were in the settlement 153 people. In that year the wealth of the community included fifty dwellings, 228 cattle, 108 pigs and two horses, all markedly concentrated north of the river. No sheep were recorded, although 182 acres of forest had been felled.

Subsequent history is obscure. Apparently further small clearings were established to the south along the beach and in the Little Wanganui area; and with the passage of time population increased as flax and timber mills were established and farms were extended. By 1901 there were 405 people in the district; in 1906 four timber mills cut nearly 400,000 railway sleepers, and during the same year a factory at Karamea manufactured twenty-seven tons of butter produced from 'the milk of 400 cows'.[20]

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[16] Letters from Charles Heaphy, 20 June, 18 July and 19 September: *Nelson Examiner*, 1846. See also M. McCaskill: 'The Poutini Coast: A Geography of Maori Settlement in Westland', *N.Z. Geographer*, Vol. 10, No. 2, October 1954, p. 137.

[17] J. von Haast: *Topographical and Geological Exploration of the Western Districts of Nelson Province*, Nelson, 1861, p. 132.

[18] See *Append. Journ. House of Repres.*, (D-7), 1877 and (H-9), 1879.

[19] As late as 1878 the pioneers complained that 'the first yard of road has yet to be made in the Karamea Settlement', *ibid.*, (H-9), 1879, p. 21.

This steady development was interrupted by the Murchison earthquake of 1929. Karamea suffered more severely than any other locality away from the Murchison area, and had transport been available at the time many of the people would have abandoned their homes. Apart from the immediate structural damage caused by the termors, a longer-term effect came from the filling of the estuary by tremendous quantities of sand brought down from the slip-scarred mountains of the interior. Karamea was deprived of its harbour facilities; and today coastal shipping no longer calls. The winding hill road southwards to the Mokihinui is now the link with the outside world.

Dairy Farms amid Bush and Scrub

Karamea township, business centre for the district, is located about a road junction near the mouth of the river. Like Collingwood, it no longer functions as a port, and the residents of the twenty-five houses in the vicinity find employment in the local businesses or in more distant sawmills. Again like Collingwood, its existence is threatened by the presence of a rival 'urban' growth, a mile further inland. This is Market Cross, similarly surrounded by the green, hedged pastures of the river flat, and centring about the local dairy factory. Arapito, on the south bank of the river, but inland from the original site of Karamea, is characterised by a pleasant pastoral landscape of neat dairy farms and homes surrounded by fruit trees. Barns, and stacks of hay gathered despite the rainy climate,[21] are a feature uncommon elsewhere in the district. By contrast Umere on the north bank is a wilderness of stumps and blackberries. Both areas have as backdrop the bulky Mount Stormy Range, 3,500 feet high, and the spectacular cleft of the Karamea Gorge.

To the north lies an extensive swamp, ringed by dairy farms and partially enclosed by forest. Settled, but poorly used, sandhill country stretches for some miles north of Oparara, and a new mill, one of five in the district, has been built where the hill forest extends down to the narrow flats. Lupins and other scrub growth cover much of the 'cleared' area and give an indication of the rather primitive level of dairy farming carried on generally throughout the Karamea district. The undoubted scope for increased farm production is symptomatic of the rather lackadaisical outlook of the local farmers and of the manner in which social attitudes may influence the appearance of the landscape. Karamea is further set apart from the majority of dairy farming areas in New Zealand by the absence of power distribution lines.

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[20] *ibid.*, (C-1) and (C-4), 1907.

[21] Karamea annually receives about seventy-five inches, Arapito almost a hundred inches.

The trait of haphazard farming methods persists along the narrow coastal belt to the south and here, too, considerable areas of native forest remain to be cleared, especially on the swampy lowland between the dunes and the high terraces. The coastal lowland ends abruptly at the mouth of the Little Wanganui, and the rugged, heavily-forested belt of hill country extending to the Mokihinui River forms the southern boundary of Northwest Nelson.

Other Areas

Other minor areas add detail to the settlement pattern. These are located in the north and east of the region and include Farewell Spit, the coastal terraces between Takaka and Collingwood where the Onekaka iron works stand, the tiny bayhead lowlands around the coast between Riwaka and Tarakohe, and the cleared slopes and summit areas along the Arthur-Pikikiruna Range which forms a continuous and lofty barrier along the eastern flanks of the region. Of greater interest is the upper catchment area of the Takaka River, an upland some three to five thousand feet high of rather gentle initial relief, but now deeply scored by glaciated valleys. This area is interesting historically as the only part of interior Northwest Nelson where goldminers were preceded by pastoralists.[22] It forms the most northerly locality in the South Island where high country pastoral farming has been undertaken. More recently it has come into prominence as a source of asbestos and of talc manganesite, and also as the site of the Cobb hydroelectric power station, the main unit of the electricity grid in the north of the South Island.

Advantages of Location

Of the major settled areas of Northwest Nelson those which have progressed farthest from their natural state—the Takaka and Aorere districts—have certain natural advantages over the others. First, they have a greater area of land suitable for settlement—this is particularly so in the case of Takaka where the available land is not only relatively extensive but also practically continuous. Second, they are closer to Nelson, the point from which all the settlements originated, and they have, or had in the early days, superior harbour facilities. This factor of location was potent and gave these areas a markedly earlier start than either Westhaven or Karamea. The occurrence of readily exploitable resources, particularly of gold, gave a further impetus to the early and rapid development of Golden Bay. Today, however, the pattern of settlement closely reflects the potentialities for economic development. Apart from the possibility of Onekaka reopening as an iron and steel centre, changes may be expected only in detail. There is likely to be no fundamental divergence from the pattern evolved during the first hundred years of European settlement.

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[22] See C. B. Brereton: *No Roll of Drums,* Wellington, 1947, pp. 115-139.

ACCESS AND ISOLATION

Two major features which add to the distinctive personality of Northwest Nelson remain—the problems of access and isolation, and of social organisation.

To a greater extent than most parts of New Zealand, Northwest Nelson is isolated from ready contact with large centres of population, accentuating a feature common to the whole of Nelson and the West Coast. The first approaches to the region were made by sea. The overland routes which were developed later have steadily increased in relative importance. Today the outlet roads, to Westport and to Nelson, form rather slender links liable to interruption from slips during heavy rain. Although both routes rise above 2,000 feet, winter snowfall rarely interrupts the transport which has become vital to the area since the decline of shipping, especially since 1930. Butter, livestock and general cargo still move across the wharf at Waitapu, the port of Takaka, mainly direct to or from Wellington, and Tarakohe cement is still shipped by sea when cargo space is available.

Within the region the problem of access is reflected in the pattern of settlement. Mountain barriers have precluded the economic development of such interior valleys as those of the Leslie, Roaring Lion and Ugly, major tributaries of the Karamea. In contrast, quite small bay-head localities around the shores of the Separation Point promontory have been occupied since the earliest days of colonisation in the South Island. External communications with the region have been persistently difficult; similarly intercommunication between the lowlands of the region has been costly to effect. Swamps at Karamea and large rivers in all the areas have placed a heavy burden on small communities seeking to become more closely knit by better roads, whilst stretches of barren country have imparted additional burdens. These difficulties are reflected in the complex patterns of social organisation.

Yet without a detailed sociological investigation, the extent of the divergence of Northwest Nelson from the norm of New Zealand rural behaviour cannot be judged. That such divergence exists seems probable, but that it has arisen solely as a result of physical isolation is highly unlikely. Present social structure and past social and economic history also must be considered.

Conclusion

In its physical geography Northwest Nelson displays a certain overall unity which is the framework of a detailed regional diversity. The region has experienced a series of historical changes in its economy, but today grassland farming and dairy production are dominant in the settled areas. Urban development is limited, and the population is scattered in a dispersed pattern around the fringes of an inhospitable interior. Road connections with outside centres have replaced the historically more important connections by sea. Railways, so important in other parts of the country, have played no direct part in the life of the region. Karamea is orientated towards Christchurch economically, Golden Bay towards Wellington. The pattern of human activities indicates the difficulty of interpreting satisfactorily the character of a region which, despite a superficial physical unity and a similarity of historical development, is divided now into major areas between which there is little community of interest. In terms of cultural geography, Karamea is part of the West Coast; Golden Bay is a segment of the district centred on Nelson.

TRANSHUMANCE IN TASMANIA*

PETER SCOTT

IN TASMANIA transhumance[1] has been practised between the main sheep-rearing areas and the Central Plateau since the early days of settlement in the Midlands and the Derwent Valley. But in spite of an established place in the local farm economy extending over more than a century, the custom has hitherto passed unrecorded. It is disregarded in official census returns, and only passing reference is paid to it in agricultural and historical writings. Recently, therefore, a farm survey was undertaken to determine the present pattern of sheep migrations and the extent of recent change.[2] It revealed a marked regionalism in transhumance within the main sheep-rearing belt, significant areal differentiation in the pastoral use of the Central Plateau, and a substantial overall decline in the practice during the past quarter-century. Subsequently, the movement of cattle to seasonal grazings in northwestern Tasmania, a development since the first World War, was also studied.

THE SETTING

The main sheep-rearing areas of Tasmania comprise a continuous crescent-shaped belt, generally less than fifteen miles wide, extending from Launceston through the undulating Midlands to Bridgewater and Sorell, together with an extension from New Norfolk up the Derwent and Clyde Valleys to the Ouse and Bothwell districts (*Fig.* 1). Almost everywhere the climate is subhumid with microthermal temperatures (CC′r).[3] Brown soils, intermediate between podsols and black soils and comparable with the wheat soils of the Australian mainland, support a natural vegetation of wallaby grass (*Danthonia*), kangaroo grass (*Themeda*), spear grass (*Stipa*) and tussock grasses (*Poa caespitosa* and *Agropyrum scabrum*) with scattered eucalypt trees (*E. coriacea, E. Gunnii* and

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* This article is a summary of a paper read to the Tasmanian Branch of the Australian Institute of Agricultural Science, 17 September 1954, together with a later study of cattle transhumance. The writer's thanks are due to the stock inspectors of the Tasmanian Department of Agriculture, especially Messrs. P. H. d'Emden, W. A. Robertson and G. Smith, without whose enthusiastic help this survey could not have been undertaken.

[1] Transhumance may be defined as the alternating seasonal movement of livestock between a permanently-settled area and a temporarily-occupied area normally located at a higher altitude and experiencing different climatic conditions.

[2] The survey included a visit by the writer to every Midlands farm which failed to respond to a detailed questionnaire, and to all farms in northwestern Tasmania as defined in Figures 11 to 13.

[3] For the climatic regions of Tasmania according to the 1931 Thornthwaite classification see State Economic Planning Authority: *Regional Planning Atlas: Economic Resources of Tasmania*, Hobart, 1947, Map No. 25.

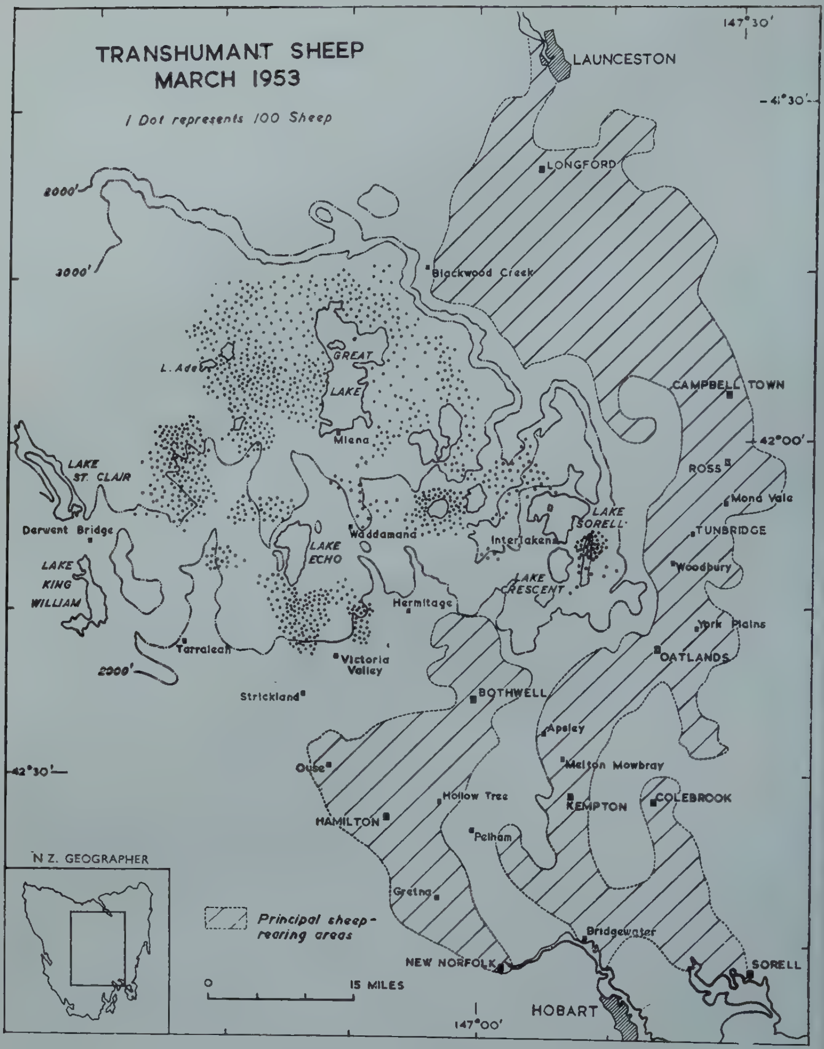


Fig. 1. Transhumant sheep, mostly Polwarths and Merinos, on the Central Plateau of Tasmania, March 1953.

E. viminalis). The carrying capacity of the native grasses averages one sheep to one and a half acres. Some areas, formerly cultivated for wheat, have been successfully sown to subterranean clover and perennial rye-grass, but in general soils are too stony for mechanical cultivation, and the summer rainfall is too low and variable to permit much pasture growth. Accordingly, graziers experience a shortage of feed in summer and early autumn, which is made good by some through transhumance to the lake country.

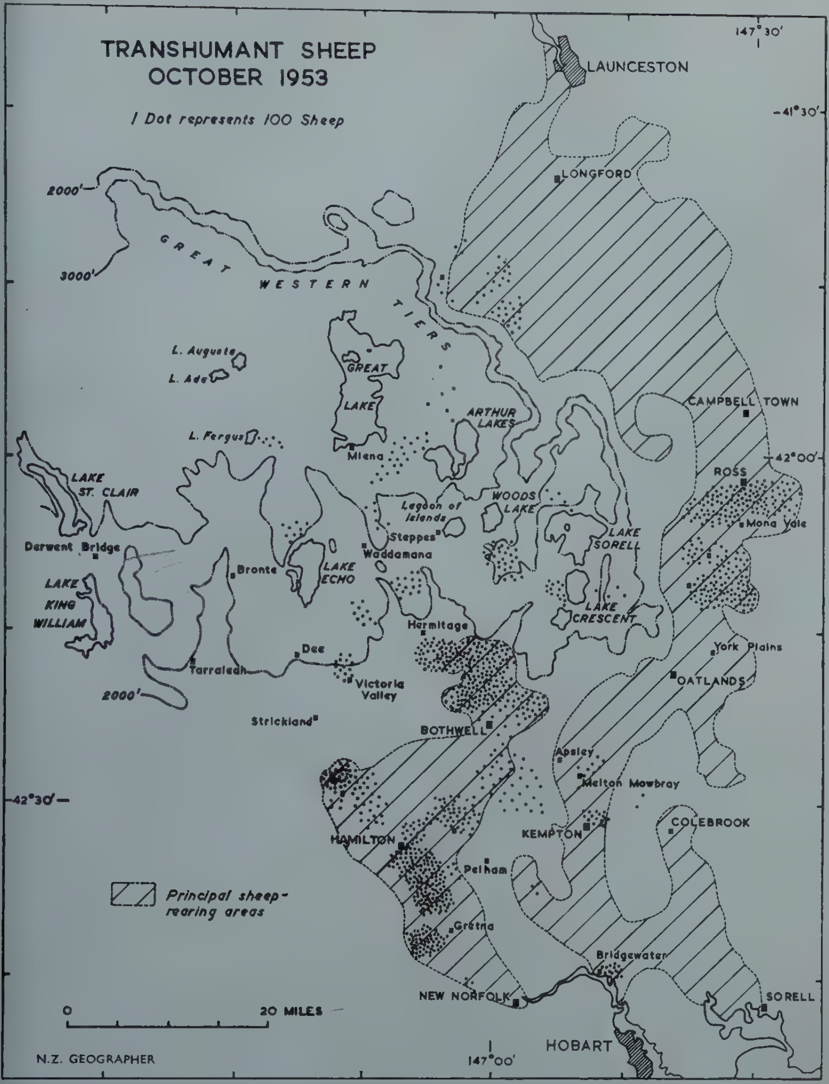


Fig. 2. Transhumant sheep, October 1953. The dots refer to the same sheep as those shown in Figure 1.

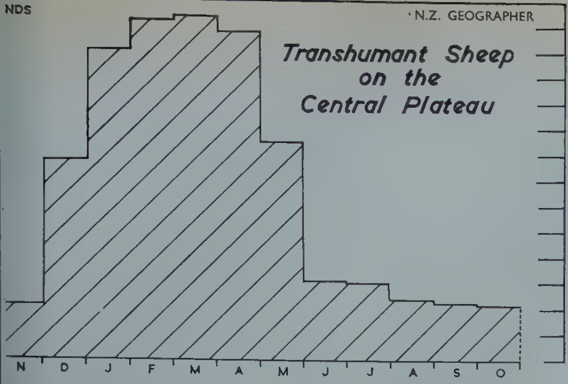
Summer pastures grazed by transhumant wool sheep and store cattle are located mainly on the dolerite plateau in north central Tasmania, but some use is also made of the lower eastern plateau around Lake Leake and Tooms Lake. The Central Plateau, averaging 3,500 feet in height in the north, terminates northeastwards in the 2,000-foot fault scarp of the Western Tiers, but slopes gently southeastwards, draining mainly to the Derwent. A humid climate prevails above about 2,000 feet, taiga conditions above 3,000 feet, and a superhumid climate in areas north and west of Great Lake. In general, the taiga zone is exposed, windswept and treeless, the vegetation comprising a variety of heaths, sedges, sags, leguminous shrubs and poor tussock. Much of the surface, however, is rendered useless for grazing by extensive screes and morainic deposits, innumerable marshes and lakes occupying shallow depressions, and intervening rocky ridges which are called tiers. Southwards, in the microthermal zone, eucalypt forest has been cleared and kept open by burning, but scrub and bracken now cover large areas. In favoured localities on the southern fringes of this zone, notably near Victoria Valley, north of Hermitage, and southeast of Lake Crescent, carrying capacity for a summer grazing season of five months may be as high as one sheep to two acres, but elsewhere the capacity averages one sheep to three acres. Locally it is much lower than this. In the taiga zone, the capacity is everywhere lower, even on the occasional patches of basaltic soil; the Great Lake plains, for example, which are grazed extensively, carry on an average one sheep to five acres.

Some indication of the limits of winter grazing is given in Figure 2. It is noteworthy that the exposed microthermal areas around Bronte are not considered winter country, whereas more sheltered taiga areas around Arthur Lakes carry stock throughout the winter. In fact, the boundary cuts across climatic divides in that it trends northwards along the western shore of Lake Echo and then northeastwards between Great Lake and Arthur Lakes. In the eastern taiga zone, however, stock losses in winter are high.

THE PRESENT PATTERN

In 1953 more than 135,000 sheep and 2,600 cattle migrated from sixty homestead properties to the lake country for summer grazing. Since the proportion of the home flock moved ranged from eleven to sixty-six percent, the total sheep carried by these properties amounted to more than 350,000, or nearly one sixth of Tasmania's sheep population. At the same time the homesteads numbered only one percent of all holdings with sheep, so that transhumance is essentially a feature of large-scale, extensive pastoralism.

The average migration involves moving 2,600 sheep and perhaps 150 cattle over a distance of forty miles in three days. Movement is almost entirely by foot; even the drovers seem to walk most of the way, perhaps to lessen the burden of their otherwise laden pack horses. Drovers are, however, a fast-vanishing folk, and owners are increasingly



ig. 3. Transhumant sheep population on the Central Plateau, November 1952 to October 1953.

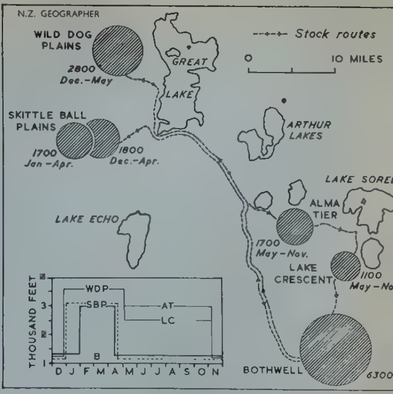


Fig. 4. Seasonal migrations practised by th
Dennistoun Pastoral Association, Bothwell

forced to move the sheep themselves. Trucking, except occasionally of weak animals and stragglers, has never been practised, for graziers allege it would render transhumance uneconomic. At intervals along the main stock routes, overnight accommodation paddocks have been provided by the government, but saleyards located in most towns en route are also used.

Lake runs range up to 30,000 acres in extent, being generally larger in the north and west than in the south and east. The proportion of Crown land held under lease varies greatly with individual holdings, but averages about two-thirds, the rest being freehold. Only about three-fifths of the transhumant flocks are cared for by shepherds permanently resident on the plateau. Other flocks are merely left to forage at will over partially-fenced country. Under such conditions losses tend to be high, but normally they average only one or two percent.

The main upward movement takes place after shearing and dipping in December and early January (*Fig.* 3). Thereafter the transhumant population of the plateau remains fairly constant, fluctuating only between 120,000 and 135,000, until mid-April, when the main exodus begins and continues until the end of May. A minor exodus occurs in July, mainly from the humid microthermal zone. Subsequently, until November, the winter sheep population fluctuates between 25,000 and 20,000.

Complex movements are rare. In 1953 only five graziers undertook migrations within the lake country which involved the successive use of summer and winter runs located in different climatic zones. There were, however, no less than twenty-one graziers who used the same run for both summer and winter grazing, and since the carrying capacity varies with the season, a proportion of the stock was returned in April or May. Where breeding ewes, two-toothed wethers and dry ewes were carried, these were invariably returned first; usually in March from the taiga zone and in April or May from the microthermal zone. A further nine graziers used their lake runs only in summer but staggered their movements: two the upward movement only, three the downward movement only, and four both movements. Such variations stem from differing pasture conditions on the home runs, weather and grazing conditions on the plateau, accessibility, and personal preference or convenience. The remaining twenty-five graziers practised single upward and downward movements.

Transhumance a Marginal Economy

Accessibility has not only influenced individual practice but has produced a marked regionalism in the pattern. Current migrations derive almost entirely from four source regions, each of which commands a major stock route (*Figs.* 2 and 5). Formerly these regions were more extensive and less well defined, but because transhumance is fundamentally a marginal economy which tends to decay in times of prosperity or with improvement in farming practice, homestead properties more remote from the lake country or less accessible to migration routes no longer depasture stock on the plateau. This applies particularly to the rich pastoral country of the north Midlands but also, to some extent, to the smallholding areas of the south.

A comparison of the source regions with official pastoral statistics reveals clearly that transhumance is largely a function of extensive sheep farming.[4] Source regions everywhere show densities of less than 600 sheep per 1,000 acres of agricultural land, whereas the rest of the sheep belt has densities exceeding 800 and the Longford area even 1,000. Moreover, the boundary of those areas having between four and eight times as many sheep as cattle, measured in terms of livestock units,[5] is more or less coterminous with the areas of transhumance, if both homestead areas and summer grazings are included. There are even outliers coterminous with the Bridgewater area in the south and the Bridport and Cape Portland area in the northeast.[6] On the other hand, the ratio of sheep to cattle is much lower in the northern and southern sections of the sheep belt. Again, the lack of any relationship between areas moving cattle and the overall distribution of cattle would seem

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[4] Agriculture and pastoral statistics for Tasmania, published on the basis of only forty-nine municipalities, mask many significant local variations. Accordingly, this paragraph has been compiled from an examination of the unpublished statistics for 120 police districts kindly made available to the writer by the Deputy Commonwealth Statistician for Tasmania.

[5] Seven sheep equal one head of cattle.

[6] A northern property has recently acquired runs in the northeast for depasturing between 1,500 and 2,000 sheep. No movement, however, took place in 1953.

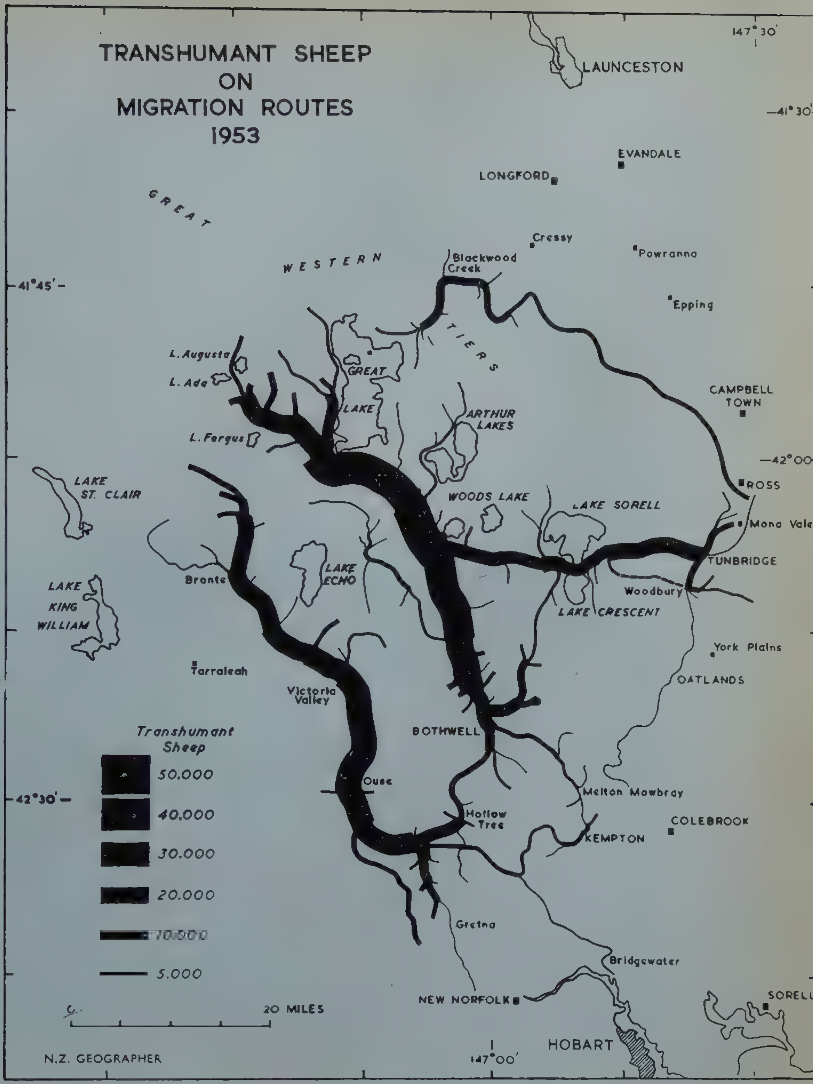

Fig. 5. Movement of transhumant sheep along stock routes to the Central Plateau, 1953.

to suggest, and rightly, that the subordinate movement of cattle is merely an accompaniment to the movement of sheep. Finally, transhumance is confined to those areas of the sheep belt having the highest percentages of rough grazing and, therefore, the lowest percentages of improved pasture.

The Bothwell Region

Among the source regions Bothwell stands preeminent. In 1953 twenty-one graziers despatched 60,000 sheep and 750 cattle to the lake plateau. Most of the homesteads lie at some 1,200 feet in a well-defined basin north of Bothwell, but the region may be said to include outlying farms at lower altitudes near Apsley and Melton Mowbray since these also make use of the Lake highway as a stock route. (See Figure 6.)

Most of the lake runs are situated in the taiga zone west of Great Lake at elevations ranging from 3,000 to 3,800 feet. They vary in area from 2,000 to 30,000 acres and the carrying capacity from three to eight acres a sheep. The distances covered are from thirty-five to fifty-five miles, and average forty-two. Transhumant flocks, mostly numbering less than 3,000, range in size from 500 to 6,700 and transhumant herds from twenty-five to 130.

Photo: The Mercury, Hobart

Fig. 6. A mob of transhumant sheep on the Lake Highway, the principal stock route to the Central Plateau.

Intraplateau movements are undertaken by three Bothwell graziers. In April or May, when the general exodus from the Great Lake plains begins, some stock are moved eastwards to winter near the Steppes or Interlaken. Such movements to more sheltered areas having a lower precipitation frequently involve no change of altitude[7] (*Fig.* 4).

The Hamilton Region

Hamilton is the regional centre of important pastoral country which lies along the Derwent and its tributaries, the Ouse and the Clyde, and

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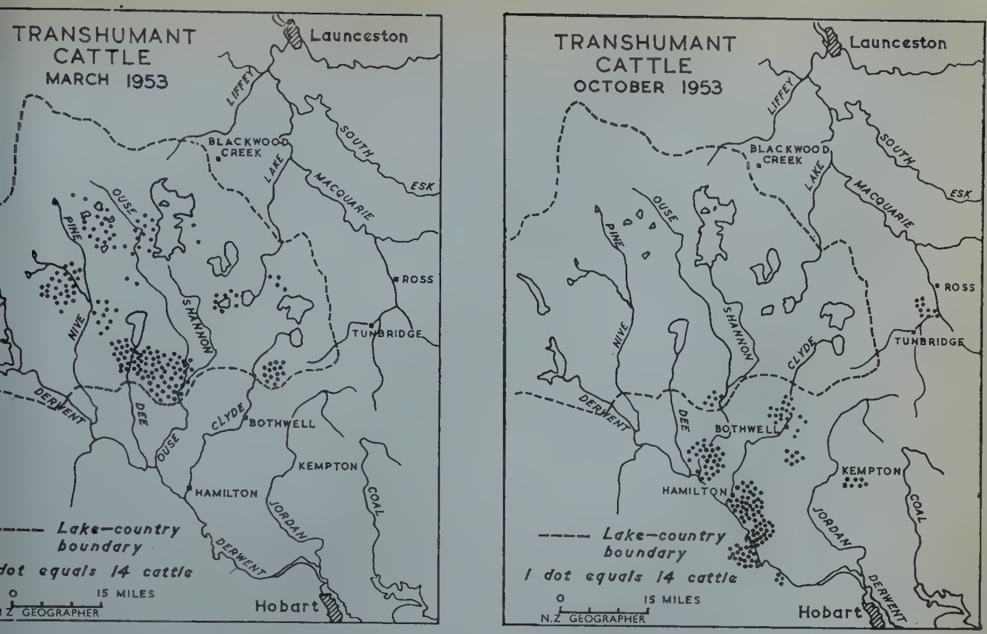
[7] The frequency and intensity of snowfall, the number of days per season when snow lies, and the duration and depth of continuous snow cover are all important factors affecting the suitability of lake runs for winter grazing. Unfortunately, however, the Commonwealth Meteorological Bureau in Tasmania does not record snow data.



Figs. 7 and 8. Transhumant cattle on the Central Plateau, March 1953, and on homestead properties, October 1953.

which furnishes the second largest contribution to sheep transhumance in Tasmania and the largest contribution to the movement of cattle to the lake plateau (*Figs.* 7 and 8). The year 1953 witnessed the migration of 45,000 sheep and 1,700 cattle from fifteen homestead properties, most of which lie between Ouse, Hollow Tree and Gretna. In elevation, the farms range from 1,300 feet to 200 feet, being generally lower than those at Bothwell. Similarly, the average elevation of the lake runs is also lower, ranging from 3,000 feet northwest of Lake Echo and north of Waddammana to 2,000 feet at Victoria Valley, so that the altitudinal range between the home run and the lake run remains much the same. Nearly 30,000 of the transhumant sheep migrated between thirty and thirty-eight miles, almost all the remainder between fifty-five and seventy miles, and a mere 500 the average distance of forty-six miles. The journey took from two to five days. Transhumant flocks varied in size from 300 to 9,000 and the herds from fifty to 400, both flocks and herds being generally larger than those from Bothwell. The principal stock route is the Lyell highway through Hamilton, Ouse, Victoria Valley and Bronte.

Many of the lake runs owned by Hamilton graziers differ climatically from those used by Bothwell graziers. Whereas taiga conditions prevail over more than four-fifths of the Bothwell runs, they characterise less than one third of those in the Hamilton region. Nevertheless, the microthermal belt extending from Bronte to Waddammana is nowadays little used for wintering cattle, and still less for sheep, largely owing to a decline in carrying capacity. Thus pastures near Lake Echo which were formerly used for fattening cattle now carry a much smaller number of store cattle only. A Kempton grazier, however, who summers 1,500 wethers and eighty cattle on the Marlborough Plains near Bronte, still winters them at Victoria Valley.

Since microthermal conditions around Lake Echo permit permanent grazing in favourable areas, some local practices are only partially transhumant. One grazier resident at Glenora, west of Gretna, maintains a breeding herd of 230 cows permanently near Victoria Valley. Although the lake run consists mainly of native pastures, some of which have been topdressed experimentally, a small acreage has recently been sown to permanent pasture. The terrain is undulating with black-soil marshes at varying elevations, which in summer and autumn carry a rich pasture but which in winter and spring are usually waterlogged. At such times the breeding herd receives a supplementary ration of conserved fodder. Calves are dropped in November, weaned at the end of April, and taken down thirty-six miles to Glenora in early May. Until 1950 the steers normally spent their second summer at Victoria Valley, but in recent years they have been fattened earlier at Glenora and their second migration eliminated.

Permanent settlement also occurs within this microthermal belt. One large homestead property at Waddammana carries 3,000 sheep throughout the year. These have not been shown on the accompanying maps. Moreover, numerous smallholders live under marginal conditions along the Lyell highway from Victoria Valley through Bronte to Derwent Bridge. This dispersed linear settlement comprises two-roomed slab huts of split logs and shingles. They house a closely-intermarried community in which two surnames account for perhaps two hundred families. Their chief occupation is snaring kangaroos and opossums for their furs, but graziers with large lake runs near the Lyell highway claim that sheep stealing is rife. However, probably only thirty families own sheep, and individual flocks rarely exceed 300.

The Tunbridge Region

In 1953 the third most important origin of sheep transhumance was the Tunbridge region, extending from Woodbury northwards to Ross. The movement involved more than 25,000 sheep but only 150 cattle; the sheep were contributed by ten homesteads, the cattle by only two. All the homesteads lie between 800 and 900 feet in elevation, but the plateau holdings range from 2,700 up to nearly 4,000 feet, so that altitudinal changes involved in transhumance are characteristically greater here than for either the Bothwell or Hamilton regions. The most extensive lake runs (15,000-20,000 acres), carrying some three-fifths of the transhumants, are located in the taiga zone surrounding Great Lake, but there is also a marked concentration of smaller runs of 5,000 acres each in the microthermal areas surrounding Lakes Sorell and Crescent, though relatively little use is made of them for winter grazing. In contrast to the Bothwell runs, more than two-thirds by acreage are held freehold. All the lake runs are accessible by the Tunbridge-Miena road, which joins the Lake highway from Bothwell at the Steppes, but some graziers prefer to use the Old Tier road from Woodbury to reach the runs east of Interlaken, and the Cressy-Blackwood Creek road to reach the northern shores of Great Lake. Some three-fifths of the stock travel distances of twenty to forty miles; the rest cover between fifty and sixty-five miles. Stock travel entirely on the hoof, the journey lasting from two to six days. Individual flocks are generally not as large as those from Hamilton, but compared with Bothwell there are proportionately fewer small mobs, so that, despite a lower range in size (230 to 5,150), the average flock numbers the same. Only four shepherds are employed at the lakes.

Ross to Great and Arthur Lakes

Simple transhumance is the rule—only three graziers stagger the downward movement and none practises intraplateau migrations. A Ross grazier, however, has two lake runs: one northeast of Great Lake, known as Cyder Park, and the other along the northern shores of Arthur Lakes. The homestead property covers nearly 24,000 acres, of which 19,600 acres comprise native pastures, mainly wallaby grass and tussock, and the rest improved pastures, mainly perennial ryegrass, wild white clover, and subterranean clover. Irrigated pastures occupy 140 acres of alluvial soils along the Macquarie River. Stock number 15,000 sheep and 400 cattle. Normally in recent years some 2,000 wethers have been sent to Cyder Park via Cressy and Blackwood Creek and a further 2,000 to Arthur Lakes via Tunbridge and the Steppes. These sixty-mile journeys, undertaken at the turn of the year, take four days. Cyder Park covers 16,500 acres, of which 13,755 are held on Crown lease and the rest is freehold, but most of the Crown land is regarded merely as drought-relief country. In unusually dry summers, such as that of

1954–1955, when the carrying capacity of Midland pastures is seriously reduced, some 4,000 sheep, including ewes, are sent to Cyder Park, returning as usual in April or May. During the 'forties, the Arthur Lakes run, a 9,600-acre freehold property situated within the taiga zone, carried 1,600 wethers from January to September, but losses were so high in winter, ranging as they did from four to eight percent, that sheep are now returned in June. The shorter grazing season has not only reduced losses substantially but has permitted an increased stocking rate.

THE BLACKWOOD CREEK REGION

The Blackwood Creek region contrasts markedly with the three principal sources of transhumance. Here the practice has declined more sharply than elsewhere, and in 1953 involved only 4,080 sheep from five small properties. The stock were moved an average of fourteen miles up the steep face of the Western Tiers to holdings situated north-east of Great Lake, some 3,000 feet above the homesteads. Perhaps because of the small scale of operations, local practices present some novel features. Thus one grazier rents from a nearby landowner a small lake run in the humid taiga zone for carrying 430 wethers from December to October, despite the extreme elevation of 3,600 to 3,900 feet, the prolonged snow cover in winter, and the necessity of bringing in fodder by pack horse up the difficult track from Blackwood Creek. Losses are said to be small. The same grazier has recently experimented successfully with growing turnips on the plateau. A contrasting experience comes from a neighbour, who formerly moved 1,300 sheep up to his 5,400-acre lake run in early January, brought down 700 two-toothed wethers and dry ewes in May, and left the older wethers until September. His losses were so high, reaching fifteen percent in some years, that he no longer moves stock. It is significant that other graziers from Blackwood Creek normally use their lake runs from December to April only, and rarely experience heavy losses. None employs a shepherd.

THE EASTERN PLATEAU

The lower lake plateau lying east of the main sheep-rearing belt provides further examples of transhumance, but here the practice has never developed on a comparable scale mainly because the climate is everywhere subhumid, despite P-E indices approaching humid conditions. The practice on one estate extending from Avoca (P-E index 39) southwards for fifteen miles to Lake Leake (P-E index 62) involves the seasonal movement of 29,000 sheep through country ranging from 650 feet up to 2,100 feet, but since these migrations are confined to a permanently occupied holding, they are not strictly transhumant. In the Yorks Plain area, however, stock are moved from three properties some fifteen to twenty miles eastwards to Tooms Lake, but, though strictly transhumant, these migrations involve no great change of altitude, both areas lying between 1,200 and 1,800 feet. The lake runs, all heavily timbered, cover 3,317, 8,000 and 14,000 acres but carried only 778, 634 and 300 sheep respectively in 1953. The last-mentioned run also carried twenty-five cattle. No shepherds are employed and, presumably through stealing, losses are remarkably high—forty, seventy and fifty sheep in each case. It is perhaps noteworthy that the same runs carried 1,200, 2,400 and 1,150 sheep respectively in 1925. The grazing period extends from January to October.

NORTHWESTERN TASMANIA

In the Marrawah-Redpa and Smithton districts of northwestern Tasmania, which together constitute the premier dairying region in the state,[8] cattle are wintered on public agistment runs. Here, however, the migrations are not between areas differing in altitude and climate, since the entire region lies below 500 feet and humid mesothermal conditions (BB′r) everywhere prevail. Nor is the variability of rainfall as great as in the drier Midlands and Derwent Valley. Rather is it that the proximity of Crown land available for public use has resulted in improved pastures being reserved on some farms for cows in milk and as fattening paddocks. In 1954 the region as defined in the accompanying maps (*Figs*. 9 to 11) contained 588 farms, of which 556 carried cattle but only seventy made use of public runs. Of the 37,840 cattle in the region, the movement involved only 4,420, mainly dry cows and some store cattle: 2,210 from forty-three widely-scattered farms in the Smithton district, 1,965 from thirty-five contiguous farms at Marrawah and Redpa, 125 from a farm at Wynyard, and 115 from another at Temma (*Fig*. 9). Aside from the 1,700-acre property at Temma and a 1,200-acre property at Stanley, the farms range in size up to 650 acres, the average being only 175 acres with 125 acres under improved pasture. In general, the smaller the property, the higher is the proportion of

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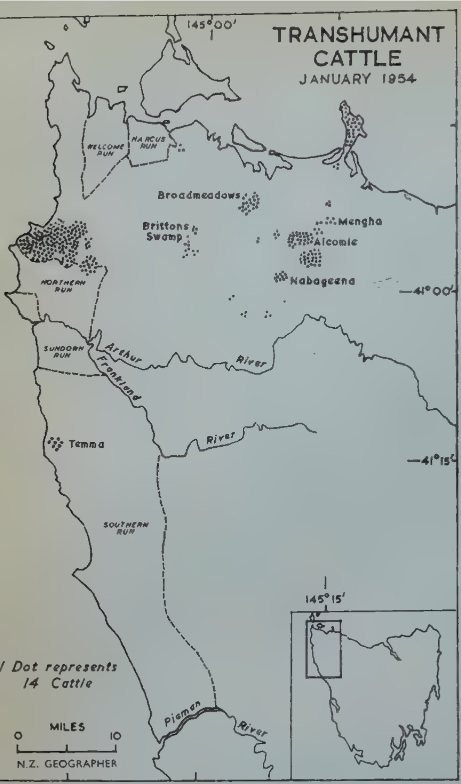
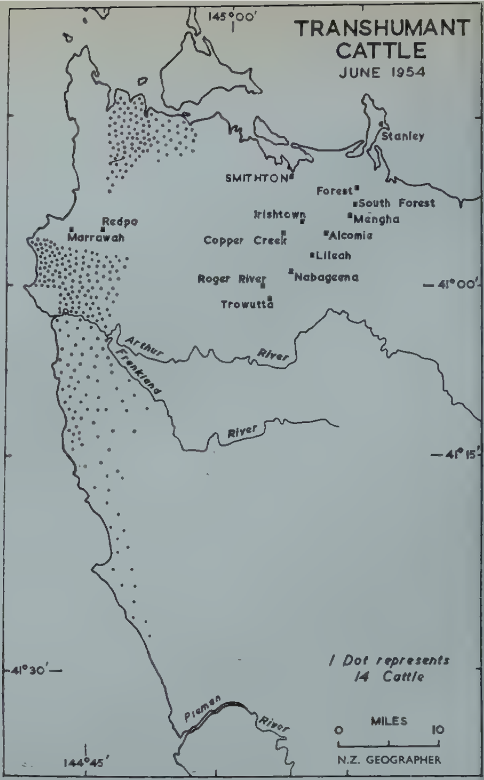
[8] At least, if measured in terms of cattle density. Thus Marrawah-Redpa is the only district in Tasmania with a density of dairy cattle exceeding 300 per 1000 acres of agricultural land; it is closely followed by Smithton. Moreover, Marrawah-Redpa and Smithton are the only districts where the density of cattle of all types exceeds 350. Marrawah-Redpa has 393 and Smithton 356, while Ulverstone ranks third with 301.





improved pasture. Although the number of stock moved from each farm is not large, it is the practice for cattle to travel in large herds, the owners arranging among themselves for three to six men to undertake the droving and, at the end of the season, the mustering and removal from the runs.

The five agistment areas are all located on the coast. In the north the Welcome and Harcus runs, named after boundary rivers, cover 10,000 and 7,000 acres respectively and are available for cattle of all types from 15 February to 1 October. In the west, the Northern run covers 30,000 acres and is open only to dairy cows from 15 April to 30 October; the Sundown run, also named after a boundary river, covers 16,000 acres and is used mostly for yearlings and cattle whose lactation period ends early; the Southern run, some 230,000 acres in extent, is available for beef cattle, including speyed cows and heifers, and like the Sundown run is open from 15 February to 30 October. Each run is managed by a ranger responsible for the repair of fences, the recording of entries and departures, and the drawing up of accounts.

The stocking rate depends on accessibility rather than on the availability of feed (*Fig.* 10). In 1954 no less than 1,778 cattle were concentrated on the Northern run and there was a rapid decrease eastwards both in the number of farmers furnishing stock and in the number of

Figs. 9 and 10. Transhumant cattle in northwestern Tasmania — on homestead properties, January 1954, and on agistment areas in June 1954. The dots refer to the same cattle.

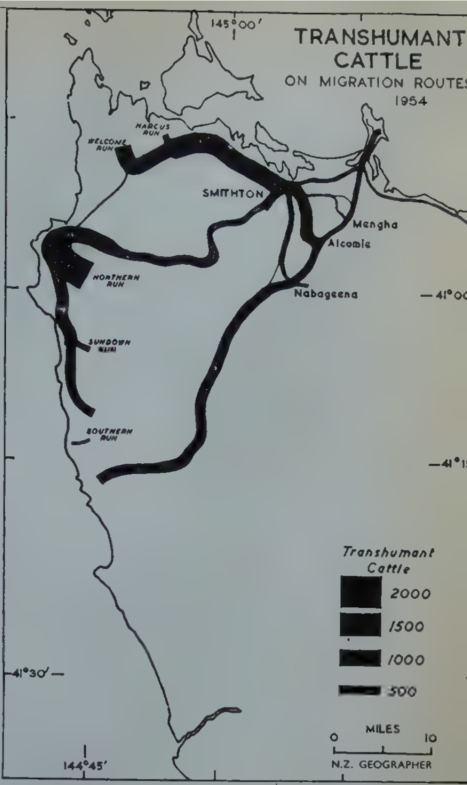


Fig. 11. Movement of transhumant cattle to agistment areas, 1954.

stock furnished per farm. Thus from Marrawah came 920 cattle from seventeen farms, or fifty-four per farm; from Redpa 615 from fourteen farms, or forty-three; from Brittons Swamp 230 from seven farms, or thirty-three; and from Copper Creek twenty-eight from a single holding. Ten stockowners not only made use of the Northern run but also depastured a few cattle on the Sundown run, which carried in all 205 cattle from twelve farms. The Southern run, despite its size, received only 1,140 cattle from eleven holdings, mostly from relatively large fat-stock properties between Trowutta and Stanley. In the north, the Welcome run—the most heavily stocked of all the agistment areas with over 1,000 cattle derived from seventeen farms—drew from areas as widely separated as Marrawah, Trowutta, Stanley and Wynyard, while the Harcus run took its 365 cattle from seven holdings all located between Nabageena and Forest. Since the Wynyard stock were trucked as far as Smithton and then driven, the longest trek was fifty-five miles from Stanley to the Arthur River plains (*Fig.* 11).

TRENDS

The cattle migrations of the northwest have steadily increased in volume since the practice began nearly forty years ago, and in the last twenty years the number of transhumants has more than trebled. This substantial increase is attributable to an improvement in the runs and to an overall increase in the cattle population of the district. Most of the farmers agree that if cattle are left for a maximum of eight weeks in sheltered, well-watered areas they return in good condition. Nevertheless, some dairy farmers who formerly moved cattle now prefer to winter their stock on bush areas near the homestead, where supplementary feed may be given and the stock kept under closer supervision. It is in fact symptomatic that the comparable movement of dairy cattle in northeastern Tasmania from the Pyengana district to Ansons Bay, which until about 1950 involved more than 600 cattle, has virtually ceased with the development of fodder conservation. This would suggest that in the northwest, where most properties are underdeveloped, the trend will sooner or later be reversed. The change may in fact be hastened by the outcome of the current investigations by the government into the possibility of opening up the agistment areas for permanent settlement.

Decline on the Central Plateau

Whereas the stocking rate of the public runs in the northwest has more than trebled in twenty years, the overall carrying capacity of the private sheep runs on the Central Plateau has declined by at least a third. Moreover, because nine lake runs have shown no perceptible change and at least one has been improved by topdressing, the carrying capacity of most lake runs may be said to have fallen by at least two-fifths. This decline stems from a combination of factors. Over much of the plateau, the burning of the natural vegetation together with overstocking has inevitably led to pasture deterioration and soil erosion, markedly so on the exposed treeless plains southwest of Great Lake. In other areas, notably north of Arthur Lakes where, in the early 'thirties, stunted sclerophyll forest was cleared and the larger trees ringbarked, there has of late been a regrowth of eucalypts with a consequent reduction in grass cover. In the same area, but more especially on the southern slopes of the plateau, the carrying capacity has also been substantially reduced by kangaroos.

The Rabbit Problem

But more important than any of these factors, so most graziers allege, has been the infestation of lake runs by rabbits. From the early 'twenties, when rabbits first appeared on the Great Lake plains, until after the second World War, the rabbit population rapidly increased, particularly in the war years when labour was unobtainable. Yet even when labour had been available, the payment of low wages had forced many shepherds to sell skins to supplement their incomes, and such a practice was unlikely to encourage wholesale extermination. Since the war, however, many graziers have no longer employed shepherds and have carried out large-scale poisoning, which in some areas has so reduced the rabbit population that the carrying capacity has significantly improved.

Shortage of Shepherds

The difficulty of obtaining shepherds has caused many graziers to abandon their lake runs, and if this be taken into account, the decline in transhumance since 1925 far exceeds fifty percent. The decline in the use of winter runs is more marked than in the case of summer runs, for graziers unable to employ shepherds are reluctant to risk the higher losses of winter, especially in view of the prevailing high prices for wool, and therefore for sheep. It seems almost certain that the labour position will continue to deteriorate, for most shepherds still resident on the plateau are well over fifty years old and young men are not attracted by the low wages, poor housing, uncongenial climate and isolation. Conditions have, however, improved. For example, the large returns from the sale of rabbit skins in the 'forties have enabled many shepherds to purchase cars, so that frequent convivial evenings can now be spent in Bothwell or elsewhere.

Effects of Power Development

In general, hydroelectric power developments, though they have also helped to break down the isolation of the plateau, have contributed to the decline in transhumance. In recent years the establishment of construction camps has led to so much molestation of sheep by stray dogs, particularly around Bronte, that several graziers have been forced to withdraw their stock from the runs. More important perhaps has been the withdrawal of grazing areas for development works, notably west of Lake Echo. One of the first runs to be lost in this way was Reynolds Neck, formerly the largest peninsula projecting into Great Lake. At the turn of the century, Reynolds Neck was one of the few important winter runs within the superhumid taiga zone, for it contained open level glades surrounded by heavily-wooded country; today, partly submerged, it forms the largest island in Great Lake.

Although the present decline may thus be ascribed to land deterioration in the lake country, land improvement in the source regions, labour shortage, and the development of hydroelectric power resources, such factors are merely symptomatic of the decay of a marginal economy both in a time of prosperity and in competition with a more intensive use of the land. It may be safely concluded that transhumance will continue to decline, however slowly, since the increasing application of fertilisers to homestead pastures, combined with the increasing production and conservation of fodder crops, will gradually reduce, if not remove, the necessity of depasturing stock on the Central Plateau. Yet, if only because transhumant sheep furnish high quality wool, it seems unlikely that in the foreseeable future the practice will cease. Nor is there much sign of a better use being made of the lake runs which alone could ensure them a permanent place in Tasmania's pastoral economy.

EXPEDITION INTO FIORDLAND

R. H. WHEELER

THERE are still parts of New Zealand, notably in Fiordland, that are unsurveyed and unexplored. At the beginning of 1955, under the auspices of the Canterbury Museum, a party of sixteen went into such an area west of Lake Te Anau in the Murchison Range.[1] The members of the expedition arrived by car at Te Anau, travelled by launch to the head of the South Fiord of the lake, and tramped through the forest to the base camp, a dozen miles to the west. This trip took longer than was expected, mainly because the route taken had never been traversed before, and the going was slower and more difficult than in the adjacent areas previously visited. An indication of travelling time in this part of New Zealand can be gained by the fact that as long as three hours could be spent in travelling but one mile. Moreover, in Fiordland, a 'map' mile becomes considerably more when actually tramped with a pack weighing sixty or eighty pounds. The traveller is constantly skirting bogs, banks and bluffs and climbing up and down irregularities of terrain, with many detours made for tangles of trees and bushes within the forest itself. Movement on the tops of the Murchison Range was often quite good, but a party was liable to find itself 'bluffed', finding a cliff inconveniently placed between itself and its objective. This risk increased when in poor weather visibility might be hundreds of yards or just yards. Such slow going and the enforced idleness during days of heavy rain severely cut down the time in which the expedition had to make observations and exploration.

A few days before the arrival of the main body of the expedition, B. Wisely and T. Hitchings had gone ahead to receive an air drop on a selected site. Delayed by the difficulties of the unexplored route in, they had been on the site for only ten minutes when the Auster aircraft flew over the area and threw out sacks of supplies, tents, tools and some scientific equipment that could stand the fall. As soon as the camp was set up and the gear stowed, both men headed back to Te Anau and guided in the main party, trying a new route, but finding it again slow going.

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[1] The party, which remained in the area three weeks, comprised zoologists, botanists, geologists, a geographer, and several laymen who assisted greatly in the work of the expedition by helping to carry loads, pitch camps, find routes and collect specimens, as well as by hunting for meat and making compass surveys. The leader of the expedition was B. Wisely, a member of the New Zealand-American Fiordland Expedition of 1949.

The base camp was reached by the main body of the expedition after some four days' travel. One of the camps during this trip in was made in the shelter of a block of granite larger than a two-storey house, under the lee of which a single moa metatarsal bone was found. Much speculation was made upon the dearth of other bones of the skeleton, and the site, though slept on, was not dug or disturbed, so that it may, when excavated by anthropologists of a future expedition, prove to be a Maori hunters' camp.[2] The base camp was sited on one of the few near-flat and grassy areas in the locality, and proved to be a bog, wet, springy and shaking. But then, in this area, any flat land was peaty, a natural condition in a climate which has at least 200 inches of rain per annum.[3] At least the site was clear of the bush, with its shaded wetness and thick moss, was above sandfly level, but was not so high as to be on the exposed tops of the range.

From the main camp site, it was intended to send various parties to areas likely to contain *Notornis,* and to make local explorations and surveys from the peaks in order to map the locality, as had been done a year earlier in the eastern Murchison Range.[4] Reconnaissance parties were to take different routes to the coast, making observations and compass surveys en route. Thus botanists, geologists and zoologists in each party would have opportunity for a wide coverage in observing and collecting specimens of plants, rocks and animal life. However, with only two fine days in three weeks, only part of the work was accomplished. The survey with a theodolite enjoyed but one clear morning, and other stations were never established. A four-man party did very good work on a trip from base to Nancy Sound, and, in setting up three stations en route with a prismatic compass, did the only surveying carried out by the expedition. They were fortunate in the coincidence of suitable observation points and of breaks in the weather for taking bearings.

The part of Fiordland visited by the 1955 expedition, like the whole Fiordland block, is composed of extremely old rocks metamorphosed before and since Cambrian times—gneisses, schists and marbles which are totally unlike the easily-shattered, angular greywacke of so much

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[2] See R. Duff: 'Recent Maori Occupation of Notornis Valley, Te Anau', *Journ. Polyn. Soc.,* Vol. 61, Nos. 1 and 2, 1952, pp. 90-119.

[3] No records have been taken in the Murchison Range, but Milford, to the north of the area, receives more than 250 inches.

[4] This map was the work of P. K. Dorizac. The area covered by the map is some ten miles by ten located between the eastern ends of the Middle and South Fiords of Lake Te Anau, and immediately east of the scene of the 1955 expedition's activities.

Fig. 1. The base camp sited on soft bog near the upper limit of bush. In the background, Mt. Irene with its banded hard rock.

of mountain New Zealand. The similarity of these rocks to the great crystalline shield of Australia has been noted in the past and suggested as evidence that New Zealand was once linked to that continent. Often the walls of the valleys, where excessively steep and without vegetation, were banded with granites, diorites and allied rocks which contained useful minerals, but always in uneconomic quantities. Geiger counters were taken by the geologists, B. W. Collins and D. Coombs, who, besides collecting specimens and making surveys in the few hours of fine weather, noted small increases in the count, indicating some possibility of radioactive ores in the area. None were actually located, but it is possible that an economic deposit might be found by a more intensive search, but whether a uranium find would be a worthwhile economic proposition is problematical, so inaccessible is the country.

From an eminence, the country west of the Murchison Range looks, as does the greywacke range further north, to be an eroded plateau. The general height of the land diminishes westwards and the summits of the peaks are roughly accordant with some long-since eroded, formerly even, surface. The landscape is as impressive as that of Milford Sound except that vast bare walls of rock are less frequent in the Murchison Range. West of Te Anau, too, the general height of the land is less, being only about five to six and a half thousand feet, falling to three or four thousand near the coast. Severe glaciation has left the valley walls typically steep with a valley-in-valley cross-section and the plan characteristically straightened. The now valley floors are flat, forested and not much above sea level, a contrast to the many impressively sheer mountain flanks, almost vertical and four thousand feet in height. One, the Irene Bluff, opposite Mount Irene and on a concave bank of the Irene River, was covered with bush. So steep a face, of such hard rock, under any other climate, would be practically devoid of vegetation, yet here, in the wetness of Fiordland, the bush not only managed to cling to, but actually clothed, the wall.[5]

Above the Bushline

The bush reaches to about 3,500 feet, and there its dark green ends quite abruptly as the vegetation passes from beech to alpine grasses with but a narrow band of scrub. A party heading back to Te Anau lost more than an hour's valuable time at the end of a long day fighting its way through alpine scrub and small trees ten to fifteen feet high before finding the only route over a small and not particularly high saddle. The snowgrass tussock zone blended into the bare rock of the tops, which, though glaciated and showing *arête* characteristics, were markedly more rounded than the greywacke peaks of the mid-Alpine ranges. The massive, hard rock of this zone had been fretted by ice, whilst, at lower altitudes, evidence of ice scouring abounded in the rounded cols and in the acres of mammillated rock clear of even peat and snowgrass. Particularly fine examples were seen at Garnet Tarn and Robin Saddle. This tarn was so called because of the garnets which occurred in abundance and were as large as walnuts. They have little value as gem stones, however, as the individual crystals are not suited for cutting. In this steep broken country screes were common, but, again a tribute to the hard and unfissured rock, shingle was not so characteristic as, say, in the upper Waimakariri or at Arthur Pass. Glacial overdeepening was more common on the upper parts of the ranges, and tarns had been formed, some mere pools a few feet in diameter and used as deer wallows, others lakes, such as Shangri-la opposite Mount Coronation, and the smaller Garnet Tarn.

The rivers and lakes of Fiordland are remarkably clear—yet another tribute to the hard rock of which the country is made. Even in flood the streams were almost clear[6]—and much opportunity was given to the expedition to observe under these conditions. Whenever the terrain tends to flat or moderately sloping, peat forms, never much more than two or four feet in depth, judging by scour holes and streams cut in it, and though soft to lie on, it proved uncomfortably cold when a very heavy shower gave rise to a four-inch-deep surface flow of water. As nearly all camps were sited on these peaty areas, the majority of the group, equipped with air mattresses,[7] slept just above this surface flood, but those not so fortunate lay in water as the beech twig flooring of the tent became submerged, or drifted away. Before one downpour at Garnet Tarn, seven waterfalls were counted on the cirque wall; an hour later it had a tracery of some twenty-five torrents. Their roar continued for a day and a night, their accompaniment the drumming of the tent and the curses of sodden cooks endeavouring to maintain a fire on the saturated ground which was covered by running water ankle-deep. At base camp during another twenty-four hours of rain, a billy was filled and there may well have been a greater fall than the mere twelve inches measured, because the makeshift rain gauge overflowed in the night, at a time and during conditions when the scientific spirit was at a low ebb.

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[5] The forest of the fiord walls has been described as developing and rooting in 'a thick blanket of moss overlying steep ice-polished rock with no soil whatsoever in the true sense of the word. The forest is subject to frequent landslips, and all stages in its regeneration following these periodic catastrophes are everywhere evident.' (J. T. Holloway: 'Forest Survey' in A. L. Poole: 'Preliminary Reports of the New Zealand-American Fiordland Expedition', *D.S.I.R. Bull. No. 103,* Wellington, 1951, p. 59.)

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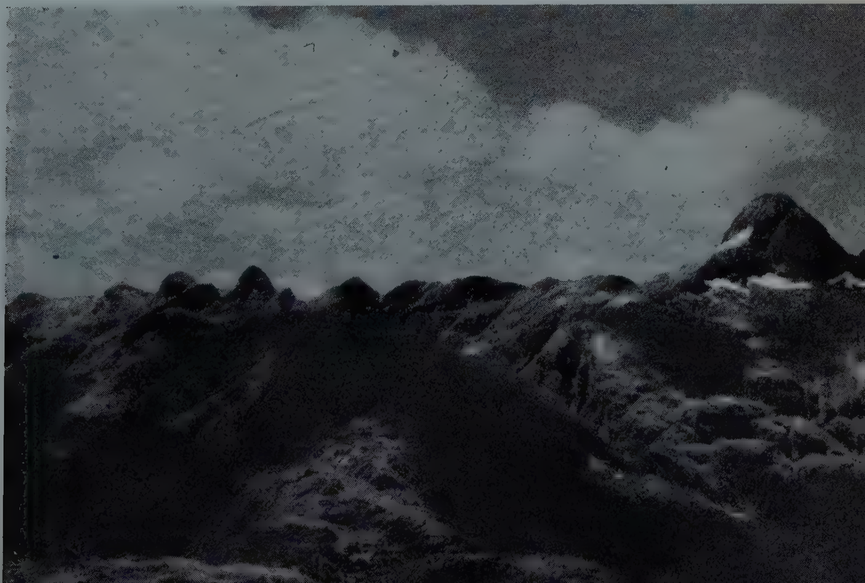
[6] '. . . there is, in effect, no soil to be washed away' so that the flooded rivers are not greatly burdened by loads of mud and silt. The rapid rise of streams during rain occurs because '. . . the forest litter and moss are perpetually saturated and have little effect in controlling runoff.' (Holloway, *op. cit.*, p. 58.)

[7] Bishop Selwyn in 1842 was similarly equipped: 'My tent is strown with dry fern or grass; my air bed is laid upon it. . . .', 'Journal of the Bishop, July 1842–January 1843' in *The Church in the Colonies.*

Fig. 2. Coronation Peak rising to 6,000 feet. The accordant levels of the peaks is a striking feature of the Murchison Range.



Strangely enough, very little wind was experienced during the stay in Fiordland. One or two gusts, usually at night, shook the tents and split one, but apart from these occasions, the weather was not notably windy and the rain fell almost vertically. Keeping dry presented a minor problem; people preferred to remain wet, rather than face the almost impossible task of drying clothes at a rain-soaked fire that barely sufficed for cooking. During both day and night the overcast sky with a ceiling only a few feet above the camp at 3,500 feet was quite light—more a tribute, perhaps, to the long twilights of the south than to any thinness of the cloud canopy. Often at eight o'clock in the evening parties were still on the move, able to follow the deer trails in the bush, and had sufficient light to make camp at nine. Those long southern days were a wearisome asset, as they enabled the expedition to rise early and make an early start for a day's work. Distances travelled were not great by mileage but a day on the move from six in the morning to almost dark, with the business of making camp and cooking at the end of it, made people extraordinarily tired.

BIRDLIFE

Among the larger finds of the expedition were those of the Nancy Sound party which found the skeleton of a kakapo and a dead kiwi in a tarn.[8] In the last hundred years the kakapo has become increasingly scarce, so that, in lieu of sighting live birds, a dead specimen was a special find, for though it was far from fresh it allowed the collection of a specimen for study. This would have been impossible had live birds been found because they are protected by law and are too scarce to be collected casually for specimens. A dead kakapo is better than no bird, and it is a safe guess that if there are dead ones—this was a corpse two or three months old—there are live ones not far away. Indeed, it would be remarkable if this were the remains of the last living kakapo in the area. The drowned kiwi was the only one seen, although on most evenings just after dark the cries of the kiwis in the bush would sound as unnerving shrieks or mournful whistles echoing through the falling rain. Two keen observers sat out two hours in the rain hoping to photograph the birds by flashlight, but they remained undetected and silent until the cameramen were back in their tent.

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[8] To obtain the skeleton of the bird, a large grey kiwi (*Apteryx haastii*), W. Dukes of the Canterbury Museum had to clean and boil it, smell and all. Lay members of the party asked what sex the bird was. Before Dukes could reply he struck with his knife what he described as 'a bone that shouldn't be there', and found an egg the size of a fist.

In various valleys searches were made for *Notornis* but only its droppings were found. Though disappointing, this conveyed one item of information sought—the probable westward limit of the takahe's peregrinations in the west Te Anau area. It is fairly reasonable to assume that the limit to the west is the line joining Mount Irene and Mount Coronation. Much talk of the possible survival of the moa in the expedition's area was proved, as it should be expected, unfounded. All members were no doubt pleased not to have been confronted by *Dinornis maximus,* the giant moa, but they (and a surprised scientific world) would have been delirious over finding a survivor of the smaller moas or any bird 'extinct' until rediscovery. But neither sight not spoor of 'new' birds was seen.

Other birds observed[9] and noted were: the South Island tit, grey warbler, yellowhead, hedgesparrow, morepork, kaka, blue mountain duck, the native grey duck, woodpigeon, the ubiquitous kea, rifleman, rock wren, crested grebe, and brown and grey wekas. The keas and wekas lived up to their reputations, the former destroying a tent and attacking the stores inside it, the latter spending busy days thieving tooth brushes, cutlery and more worthless articles, such as chips of wood and cigarette butts and, sometimes, finding scraps of food.

INSECTS AND DEER

Amongst the smaller finds were wetas. At least three different kinds were preserved in alcohol and the locality noted for later attention of a specialist. Wingless stoneflies, some species of which had been found by an earlier Canterbury Museum expedition,[10] were quite abundant. Previous to their discovery in the Murchison Range area, these peculiar insects had been known nowhere else in the world but in Japan. An odd find was the 'jumping worm', a vermiform creature about three inches long and coloured blue-green with irridescent tints, which actually leapt about when touched or placed in the hand. This has been since identified as an endemic New Zealand alpine earthworm but this is the first time a jumping habit has been observed. Common finds such as opiliones, or 'harvestmen', moths, spiders and various insects were collected in test tubes of preserving fluid and are still undergoing study and identification by the various authorities and the scientists of the expedition. Sandflies, which were not collected for scientific investigation,

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[9] This list has been compiled in part from the diary of A. Carey.

[10] An earlier find is described in B. Wisely: 'Two Wingless Alpine Stoneflies (Order *Plecoptera*) from Southern New Zealand', *Records Cant. Mus.,* Vol. 6, No. 3, 1953, pp. 219-231.

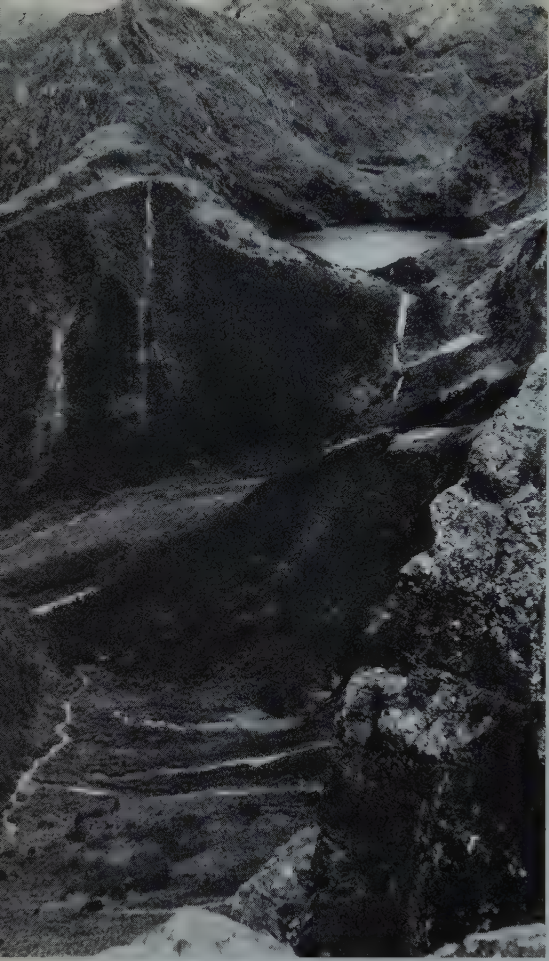

Fig. 3. Lake Shangri-la immediately to the west of Coronation Peak. This tarn occupies the floor of a large cirque and empties into a larger cirque which is joined by yet another. The combined weight of the three former glaciers eroded the step in the main valley. Vertical slip scars are visible on the bush-covered walls.

were a plague at low altitudes, especially at the head of the southern arm of Te Anau, but at heights above three thousand feet they were almost completely absent.

Of the larger fauna several wapiti were sighted, one small bull and his cows with their calves in one group, and on two more occasions wapiti hoofprints only were seen. This is the first definite report of the wapiti being found so far south, although it is rumoured that within the last few years some have been seen west of Lake Manapouri. Red deer were shot for food—often a matter of luck, for surprisingly few were seen. Deer stalkers in the party found it strange that deer were so scarce in an area hitherto undisturbed by man and rifle. The low deer population is probably a result of the rigours of the terrain and climate of the Murchison Range area.[11] The red deer seen and shot were so

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[11] A few days after the expedition had completed its investigations, A. Cookson and his wife, whilst making the first ascent of Mount Soaker ten miles to the south of the Murchison Range, observed that deer were more plentiful in that area.

Fig. 4. The Irene Bluff by the Irene River. The shoulder on the upper right of the photograph is the flank of Mt. Irene. The white tents of the base camp are visible at the bottom right. The grassed area is peaty and is interspersed with patches of beech forest growing on thirty-degree slopes.

All photos: J. McKie

large[12] that some questioned their being a pure strain and suggested a wapiti cross. Such hybridisation was suspected by the New Zealand-American Fiordland Expedition of 1949 but has never been proved or disproved.[13]

Much has been said in New Zealand about the curse of the deer. Perhaps it comes as a surprise to learn that, on the expedition, members were heard to bless the beast. Venison was one excuse for this heresy, the other being the kind provision by the animals of tracks through the thickest of bush and around the most awkward of bluffs.

It is foolish to forsake a deer trail when one offers, the penalty being time wasted in pushing through pack-clutching branches with the visibility but a few feet, and over moss-covered roots acting as trip wires, to finish up, as like as not, on the edge of cliffs or a riverbank, with no

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[1] 'In some areas localities where they are not overly abundant the animals are large, while in overcrowded ranges they are small and "runty".' (O. J. Murie in 'The Deer Population' in Poole, *op. cit.*, p. 38.)

[13] Murie: *op. cit.*, p. 26.

alternative but to double back on one's 'track'. In the 1880's Hall and his guide Te Au explored part of west Te Anau, naming the lakes Duncan, Te Au and Hilda. Theirs must have been a formidable trip, for then no deer 'stradas' existed. The 1955 visitors to Fiordland sorrowed for Hall and Te Au, but, as should be pointed out, stoats had not reduced the bird life at that time, and Hall dined on birds that are now scarce and protected.[14] In addition to the ease of ingress and exit in such country provided today by the deer it should be mentioned that in 1953 an expedition was flown to Lake Te Au by an amphibian aircraft—quick and easy, but expensive. Deer damage was seen and in one way was useful, for the deer's penchant for five finger (*Nothopanax arboreum*) left dead, antler-like wood for the fire. Saplings up to four inches in diameter were ringbarked or stripped by browsing, the dead wood mottled by tooth grazes and brittle enough to be broken off by hand.

Scientific finds[15] of this 1955 expedition under the auspices of the Canterbury Museum are still being studied and descriptions will appear in various papers by the scientists concerned.[16] Knowledge was gained not only on the purely scientific side but also on the nature of the country, on how to move through it, and on the equipment that should be taken. All this will be of value for future expeditions doing further work in the Murchison Range and the parts of Fiordland yet to be explored. This expedition achieved most of what it had set out to do. The main question, that of the limit of the *Notornis,* was satisfactorily settled; it is the western Murchison Range. Further west the terrain is apparently too rugged or the climate is too unsuitable, although it is well to bear in mind reports of takahe-like birds being seen in the mainland areas near or opposite Secretary and Resolution Islands during the last century. Finally, shortly after the main body of the expedition had left the area, B. Wisely, A Carey and T. Couzens climbed the virgin Coronation Peak, and took panoramic photographs of the locality which will help in mapping the area at present marked on maps as unexplored.[17]

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[14] In 1955 three or four stoats were seen—pests that make serious inroads on the population of native birds. Even so the rugged terrain and severe climate of the Murchison Range reduce the number of birds. See J. McClenaghan: 'A New Threat to Notornis', *Auckland Weekly News,* 30 March, 1955.

[15] Margaret Cookson brought back the first recorded flowering specimens of a new species of alpine cruciferous plant, *Pachycladon,* discovered originally in 1953 by W. R. P. Phillipson of the Department of Botany, Canterbury University College.

[16] The Canterbury Museum, itself in straitened financial circumstances, could support the expedition only in part, but much appreciated help came from individuals and business firms in Christchurch, from the Army and from the Commissioner of Crown Lands at Invercargill.

[17] A report has been prepared by Wisely and will be published in the *N.Z. Alpine Journal.*

AMERICAN GEOGRAPHY: REVIEW AND COMMENTARY*

SIXTEEN YEARS ago Hartshorne in his work, *The Nature of Geography,* essayed a complete assessment of the scope and content of a subject as old as written record, if not older. This was the first attempt to set out in all their ramifications the differing viewpoints of a discipline which had evolved slowly through time, and which had again come into its own after years of neglect and conceptual haphazardness. If it were to achieve its proper place as an intellectual study, the time had come for a definition of its field. By basing his premises on Kant's logical, chronological and chorological appreciation of reality, Hartshorne at least provided a datum for the evaluation of current theories in geography, and set the pattern of methodological thinking for many years, not only in the United States, but throughout the world.

Now another opportunity is provided for assessment—this time against the yardstick of geography in the United States. In twenty-six chapters lies a wealth of information for those 'who want to know what American geographers are thinking and doing, and what they hope to accomplish'. The book, naturally enough, has provoked thought among New Zealand geographers, especially among specialists interested in the reports on their particular branches of the subject. Their criticism and appreciation follow, chapter by chapter, and if such a division of effort does not provide the effectiveness of an overall view of an important contribution to geographic methodology, it is a fault, surely, that may be ascribed to the original work itself.

THE FIELD OF GEOGRAPHY

George Jobberns, Professor of Geography at Canterbury University College, claims that this first chapter is one of the most satisfactory in the book. James gives the whole assemblage something of a cohesion when he indicates that despite all the diversity of topics discussed, 'actually there is only one geography' and that this embraces what 'has to do with places on the earth'. The chapter contains a useful historical outline of the growth of American ideas on the nature and function of the study, and a too brief philosophical statement showing how scholars working in many sorts of specialised fields of enquiry have a common interest in the better understanding of places. It endows the whole work with a clear unity of purpose.

THE REGIONAL CONCEPT

Because regional geography is the most 'essential part' of the geographer's craft, and lies at the core of his particular point of view, *Kenneth B. Cumberland,* Professor of Geography at Auckland University College, considers that Whittlesey's chapter 'The Regional Concept and the Regional Method' is perhaps the most important in this book. It is significant also because it is not only an appraisal of the employment hitherto by geographers of the regional concept, but is at the same time a forthright statement of ideas—many of which have not been set out so clearly before, and some of which are now set out for the first time.

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* Preston E. James and Clarence F. Jones (Eds.): *American Geography, Inventory and Prospect,* New York, 1954, pp. 590. Published by Syracuse University Press for the Association of American Geographers.

Whittlesey defines the region in geography as an intellectual concept based on the selection of certain phenomena which are relevant to the problem requiring elucidation. He emphasises that it is thus pertinent not only to regional geography but to *all* phases of the science. Regions fall into different categories and, in each category, into different ranks. The distinction is clearly drawn between categories of regions based on single, multiple and total features. Whittlesey also proposes a hierarchy of that category of regions delimited in terms of 'all . . . the features of the physical, biotic and societal environments that are functionally associated with man's occupance of the earth.' This establishment of ordered ranks of regions is especially valuable in view of the persistent failure of most geographers to see their regions as fitting into any definite rank as determined by the scale and the degree of generalisation embodied in the statements applied to them.

There will be less approval, however, for the term 'compage' which Whittlesey resurrects to apply to regions recognised in terms of the 'functional association . . . of features that depict the human occupance of area'. Hitherto such regions have frequently been called 'geographic' regions. It is proposed to discard this, however, because single-feature (*e.g.* landform), multiple-feature (*e.g.* agricultural) and any other regions devised by the geographer are equally geographical. A useful distinction could be made here between 'geographical' and 'geographic'; the latter adjective could then be applied to regions defined in terms of the 'sum total of items linked together by ties of functional association'. This would be both more convenient and more appropriate than artificially resurrecting a dead and unknown noun.

Whittlesey's review again distinguishes clearly between what he refers to as 'uniform' and 'nodal' regions (what Preston James recently termed 'static' and 'kinetic' regions and what, in New Zealand, geographers have been in the habit of calling 'homogeneous' and 'tributary' regions). Equally valuable, and especially to the research student, is an outline of the methods of regional study with reference to purposes, attitudes, tools, sources and techniques of field investigation. There is also an especially valuable, though brief, review of methods for presenting the results of research in regional geography—an aspect of the geographer's task so important yet so long neglected.

There have been few, if any, better reviews of the very basis of geography than this. It may be criticised, extended and refined. But the bulk of Whittlesey's proposal will be used, and used again, much as it stands, for many years to come. It is a complete and most effective reply to the fashionable and often ostentatious attempts in recent years to reveal inadequacies in the geographer's regional concept.

Historical Geography

In this, one of the largest chapters in the book, Clark defines historical geography as 'geographical change through time' and suggests in his opening paragraph that the study of 'process' and 'change' are as essential in geography as is the regional concept. Many, *Professor Cumberland* suggests, will be inclined to dispute this claim. Even Clark has his doubts, because in the rest of his essay historical geography is either, or both, a study of 'past circumstance' or of 'change'.

Attention is drawn to 'confusion in title', to the fact that the term historical geography has in the past been wrongly applied to refer to the history of geography as a science, or to the history of exploration and discovery, or again to the influence of natural circumstances on the history of society and culture. But Clark does not clear up the confusion by claiming for historical geography that it is the study of 'change', or by considering it to be both the study of processes through time and the study of area differences at some past point of time. Changes from time to time are the concern of history; differences from place to place are the concern of geography. Unless this distinction remains clearly in mind confusion is bound to result. It follows that historical geography is the study of differences from place to place at some time in the past. This, though, should not prevent geographers from studying 'changes'. Clark himself has made valuable studies of this sort, but they are more history than geography—history as only a geographer can write it. To take New Zealand examples, it is difficult (and unwise) to embrace under the one heading—historical geography—the work of Clark (reference 184) and that of the reviewer (reference 104). They are quite different in concept, viewpoint and method—as different as history is from geography. It is, of course, competent, indeed necessary, for the geographer to trace 'changes' or 'processes' to explain differences from place to place; but this is to use history in geography, not to create historical geography. It is no different from the use of geography by historians in explaining the processes they study.

Much of this chapter is concerned with the European and other antecedents of historical geography as practised today in North America. Clark thus reviews his field more widely than some other authors survey theirs, and in doing so, he reveals his scholarly knowledge and extremely wide reading. In the United States two men have dominated the field: Ralph H. Brown and Carl Ortwin Sauer. Here again the confusion is apparent. As Clark admits, Brown's viewpoint of historical geography was that of the 'geography of the past'. His work is 'a monument . . . to the coming of age of American historical geography.' The Berkeley school, however, is principally concerned with 'the antecedents of the geography of the present'. They have attacked their problems 'historically' with 'emphasis on cultural processes'. It is significant that Sauer (unlike his students, including the author of this chapter) 'seems not to have thought of what he taught as essentially distinct from an interpretation of . . . present geography'. Perhaps confusion would be avoided by not attempting to embrace the work of the Berkeley group within historical geography. To do so would be in no way to detract from its intrinsic value to either history or geography.

The review of the contemporary American scene is followed by an appeal for wider teaching in, and better training for, historical geography, and by a most useful indication of promising avenues of research. Especially helpful is Clark's emphasis on the fact that historical geography is applicable to all branches of geography, and that all topics or elements can be studied in terms of their contribution to areal differentiation at any time in the past.

The Geographical Study of Population

In this field, claims *Harvey Franklin,* Lecturer in Geography at Victoria University College, Wellington, American geographers have contributed little. James himself calls it 'an underdeveloped topical field', agreeing with the view expressed by Trewartha in 'The Case for Population Geography', (*Annals Assoc. Amer. Geogrs.*, Vol. 43, 1953, pp. 71-97); but James reveals no inclination to raise the subject to the important place in the general study of geography suggested by Trewartha. Nevertheless the opening paragraph contains these portentous words: 'The irregularity of the distribution of mankind over the earth and the differences from place to place in the racial and societal character of the population are facts which underlie all studies in social science, including those of human geography'. One was always taught to believe that habitat constituted the underlying fact of human geography!

Population geography is defined as the bringing forth of '. . . the significance of differences from place to place in the number and kind of human inhabitants', while the fundamental problem facing the study is considered to be the need for '. . . a systematic method of outlining enumeration areas that are meaningful in terms of the question being investigated'. This is a very real problem, but it hardly constitutes the fundamental problem.

The main contributions made by American geographers consist of some valuable attempts in the fields of methods and mapping, rather than theory. The absence of theory is intimated by the references to Malthusian rates of growth. Also, successful reconstructions of precensus populations have been made, and the work of Isaiah Bowman and his associates stands out among the studies in cultural characteristics. A notable omission is the work of E. W. Zimmermann, cited elsewhere admittedly, whose concept of population as the prime and dynamic resource of all resources is surely one of the most valuable concepts handed to the geographer.

The chapter concludes with a useful discussion of the problems involved in mapping population, but there is a tendency to confuse the need for new methods of analysis and the need for new methods of presentation. It is recognised that the student of population geography requires a certain specific training. Apart from the usual geographic training, '. . . he must be competent in the use of statistical procedures, and be acquainted with the work of demographers, sociologists and social anthropologists'. Might not other students of human geography benefit from such an acquaintance and competence?

This chapter is well written, but makes no advance on Trewartha's article which should be read in conjunction. Unfortunately, however, the fundamental problem raised by population geography is left unmentioned: how can a study of population, which is fundamentally concerned with people, be incorporated into a study which, it is claimed, is fundamentally concerned with place?

The Geography of Settlement

R. G. Lister of the University of Otago points out that although over half a century has elapsed since the appearance of Meitzen's classic study of settlement forms in Europe, this branch of the subject has been pursued by comparatively few American geographers. European studies of rural settlement focused attention at an early stage upon the variety of house types and settlement forms as part of the investigation into national and regional culture. No comparably rich field awaits enquiry in America, and it was not surprising that in these circumstances, early studies in that continent had a different objective, namely, the process of occupation of pioneer areas. More recently a number of workers have found a wealth of material to hand in the regional variety of settlement forms outside America.

Considerable space in this chapter is devoted by Kohn to a review of the possibilities of study in America of the spatial arrangement of properties and road systems, though this has received scarcely any attention by geographers hitherto. The study of architectural forms has been followed by several researchers, but the broad similarity of house types across the whole continent has restricted such enquiries to relatively minor features. It is the study of settlement ensembles that has claimed the most workers, for there is a hierarchy of rural settlement forms worthy of study in every country, and there are functional relationships between the various ensembles to be understood. Unfortunately, the two maps that illustrate themes of this kind have their titles reversed (*Figs.* 5 and 7).

The field of study of rural settlement is in the early stages of its development, and so far no accepted hierarchy is generally recognised, nor are definite procedures in wide use as yet. An immense amount of work lies ahead before any world map of basic settlement forms can be produced. The field of enquiry in America opens up questions of changing patterns of settlement in the face of new technology, new transport facilities in particular. Dynamic aspects cannot be divorced from the study of the contemporary scene. Apart from the value of such studies for the light they throw upon the historical sequence of settlement, they have importance also because of the contribution they can make to the solution of current social and economic problems affecting the rural community. Rural settlement is closely related to the geography of population, of transport, and of agricultural land use, and each of these branches of the subject will gain something from advance in the field of rural settlement.

The geography of urban settlement is discussed by Mayer and his collaborators, and *L. L. Pownall,* Senior Lecturer in Geography at Canterbury University College, believes that they have succinctly stated the main concepts and have, at the same time, set out briefly the general historical background to the study of towns. Each of the main facets of urban study is touched on: urban functions, tributary areas, site and situation, distribution, internal forms and urban expansion.

Of comparable merit for the general reader—and of even greater interest to the professional geographer—is the second half of the chapter in which the authors cite nine aspects of urban study that seem to them to offer worthwhile opportunities for research.

POLITICAL GEOGRAPHY

James W. Fox, Senior Lecturer in Geography at Auckland University College, welcomes the section on political geography as a most valuable contribution, if only because for the first time concepts are set out in an orderly fashion. Nevertheless these are the concepts of one group of geographers, among whom Hartshorne dominates. It is a pity that, of necessity, so little reference is made to developments in the field outside the United States, for after all political geography is essentially European. European ways of life have in so many ways contributed to the character of phenomena to be studied and Europeans themselves have so often explored the field.

Yet no other branch of geography has experienced as many shifts of viewpoint, and the Hartshorne of 1955 is by no means the Hartshorne of 1935, or the war years even—that is, as a political geographer. Nevertheless his emphasis in 1950 on a functional approach provided the key to worthwhile study—an approach which is modified slightly in the present contribution, although it is still not clear whether 'function' is to be interpreted in the limited and customary sense or jargonistically in terms of interrelationships.

If Kantian precepts are accepted, geography must be concerned with the description and interpretation of phenomena in their areal aspects—it becomes, then, a science of areal differentiation. Consequently political geography may be defined as an appreciation of the areal differentiation of political phenomena. The question then arises as to what exactly are political phenomena—or perhaps, more accurately, what are the phenomena that have political significance. No clear-cut answer is provided in this chapter. Presumably the form, genesis and function of these phenomena may be subjected to scrutiny, but can national consciousness, for example, possess form? Has it inherent characteristics amenable to quantitative analysis? The major difficulty, of course, is that political phenomena are themselves derivatives of one particular political phenomenon—the state—and all politico-geographical interpretation must eventually lead to a consideration of the form, genesis and function of the state area, the study of which, as Hartshorne suggests, is the core of political geography. It is problematical, therefore, whether political phenomena can be studied topically since they are individualistic and are specifically related to the state in which they are found.

This point invites consideration of the relationship of political geography to the field of geography as a whole. Language is a social phenomenon, but it may also have political significance; the varying level of living, which is an economic feature, may also have application in the differentiation of political areas. Does political geography, therefore, lie outside systematic geography? Is it an integrative study of specific areas whose bounds are already set on a map? Is it, in other words, a special form of regional geography? States are certainly politico-*geographic* regions—they are not politico-*geographical,* for the complex of phenomena that characterises them does not define the state. The state defines the phenomena by virtue of its inherent political character. The committee suggests that political units are special forms of regions, but since political geography is defined as 'the study of areal differences and similarities in political character as an inter-related part of the total complex of areal differences and similarities', the presumption is that these regions are those of systematic geography.

Be that as it may, the present chapter presents a well-reasoned, balanced assessment of the nature and scope of political geography, and rightly considers geopolitics to be an 'applied' aspect of the study. It is a borderline field, more aptly termed geostrategy since it involves consideration of power relationships. Some European workers in the field of political geography might cavil at the lack of mention of environmental influences, but of the whole gamut of studies in geography, political geography is the one most significantly cultural, for it is with man the *zoon politikon* that political geography is concerned.

The Geography of Resources

Reviewing the contribution of Russell Whitaker in this field, *Mary B. Jackson* of the University of Otago emphasises that American geographers hitherto have been concerned primarily with natural earth resources. More recently, however, the direction of land classification and its assessment in relation to the total resource endowment has been the focus of much work in this branch of the subject, but there has been a consistent neglect of the cultural side of such enquiries. The appreciation of regional and local differences in human resources and in resources of material and non-material culture is an essential part in the full assessment that is needed. Much has been done towards evaluating the resource endowment of political units, though a big field is suggested by the expansion of studies to include great geographic realms such as the rainy tropics. Many workers, too, have pursued the subject of resources in relation to the patterns of economic production and trade, but in many directions there are wide avenues of enquiry for future research workers to follow.

The systematic study of each specific kind of resource has yet to be carried out in a comprehensive manner. Detailed case studies of resource depletion and resource management are needed. More specifically, there is need for an analysis of the impact of mining upon other resources. The whole subject of the historical study of natural resources, their modification over substantial periods of time, is so far little investigated. Clearly, there is much to be done, and the chapter serves to review the whole field of resources in a comprehensive manner. Geographers in America have during the past few decades played a valuable part in the development and conservation programmes of the continent, and in the next decades ahead there seems every reason to foresee many opportunities for basic research and for practical applications of such work in widening spheres.

Some Aspects of Economic Geography

In a chapter entitled 'The Geography of Mineral Production', Murphy demonstrates the distinctive field and the central theme of the geography of mineral production. The geologist, mining engineer and the mineral economist, he says, all have interests in a mineral area, but the geographer focuses his attention on the 'spatial patterns and associations of mineral production. He is responsible . . . for the examination of mining as a part of the total geographic complex of particular regions'. A geographer dealing primarily with mineral production does so in terms of an areal setting. 'Through the study of mining patterns in relation to the patterns of other relevant phenomena, he attempts to gain a deeper perspective with regard to the problems of mineral production than would be possible through the study of mining in isolation from its setting.' The writer enumerates the major aspects of the mineral complex with which the geographer is concerned.

B. H. Farrell, Lecturer in Geography at Auckland University College, however, is not in full agreement with the statement that present patterns are understandable only when their study is grounded upon knowledge 'of past changes'. Although not denying that changes are worthy subjects of study, it would seem indisputable that an understanding of a mineral region must and should stem in large part from a thorough study of the form and function of contemporary phenomena.

Yet this brief contribution by Murphy is the most comprehensive statement of its kind, and is a most valuable contribution to geographic methodology.

The geography of manufacturing is commented upon by *W. B. Johnston,* Lecturer in Geography at Canterbury University College. He suggests that three main aspects of academic study in the geography of manufacturing appear to have been firmly established in the United States in 1927 with papers on location factors, delimitation of the northeast manufacturing belt, and classification of manufactures on the basis of location type. Publications since then have added greatly to the collection but one is left with doubt as to their contribution to the development of the subject as a discipline.

The debt to economists is clearly apparent, notably to A. Weber and, later, to the more realistic E. M. Hoover. However, the approach of the economist and that of the geographer remain distinct, especially in location theory which is a field commonly explored by both disciplines.

It is perhaps most intriguing of all to ponder the relatively small literature on manufacturing by American geographers, especially since the United States is the manufacturing giant of the world. This position is in marked contrast to that in agricultural geography. The problem of statistics is far greater, for the highly competitive character of modern manufacturing must continue severely to restrict analytical work on the geography of manufacturing. These and other features are reviewed by Chauncy D. Harris who concludes with a list of 'problems needing study'.

The geographer's interest in transport is as old as the subject itself, but in general it has not been developed—possibly, *James W. Fox* suggests, because a comparatively high degree of technical knowledge is required. This point is emphasised in the present contribution, but one may wonder if sufficient regard is paid to the present tendency in many aspects of cultural systematic geography to relate description and interpretation in large measure to figures and formulae. Statistical analysis has its place in the interpretation of areal differences; it has no place in the initial description. Geographers should beware of 'scientific' approaches. Objectivity is not necessarily mathematical, and, as the French geographers have shown, there is ample scope for the description and interpretation of forms of transport, and for an evaluation of their functional relationships, without undue resort to abstruse calculation, for man's behaviour is not encompassed by mathematical symbols.

Thus, in this chapter, more might have been said on the precise nature of the phenomena with which the transport geographer is concerned. As an element in the transport 'landscape', the camel of the Sahara is just as significant as the streamliner of the Great Plains, and the bicycle in Denmark as the automobile in New Zealand. Statistical analysis can embellish the picture only when essential forms have been sketched in and major interrelationships have been delineated. But as a summary and an exposition of the present status of transportation geography in the United States, this chapter by Ullman could not have been bettered.

Climatology and Geomorphology

L. Curry, Lecturer in Geography at Auckland University College, points out that developments in the geography of climate are closely related to progress in related systematic fields, and Leighly has chosen to review the rise of climatology in the United States during the last century without limiting his field to the purely geographical aspects. He shows how friction has always occurred between the genetic, formal and functional approaches due to a lack of appreciation of the different points of view. The literary approach receives his blessing when found in popular natural history, but is deplored when found as the basis of instruction in departments of geography in the United States. On the other hand, Leighly offers no guide as to how far the geographer should go in the mathematical, experimental study of process.

Leighly offers only one definition of genetic climatology: 'The mean state of the atmosphere, a norm with which any instantaneous state can be compared.' He does not mention frequency analysis of weather types classified on the basis of the atmospheric conditions producing them. This field is thought to be the most promising at the present time. The statistical study of forms of climate has been advanced considerably in America. However, some current methods receive severe criticism —for instance, the study of secular variations without regard to the possibility of their being random, and the use of the normal curve in measuring rainfall variability.

The medical consequences of climate were the original stimulus to its study in the United States. Later came agricultural climatology and with it the strong interest which Americans have shown in estimating evaporation, of obvious concern in the arid west. Another consistent interest has been the correlation of crop yields with climatic data, although techniques developed by the British have generally been used. The earliest American climatologists claimed Humboldt with his 'comprehensive view of nature' as their master, but with the rapidly developing specialisation within climatology, it is difficult to keep a comprehensive view of the causes and consequences of climate alone.

Professor Jobberns suggests that Peltier's summary of the scope and content of geomorphology is a neat one, particularly of the evolution of contemporary ideas, noting especially the contribution to academic geography of Davis and his school. In New Zealand geomorphology rates rather as a branch of geology, or at least a good grounding in geology is thought to be indispensable for its pursuit as a specialist study. Of special interest in the essay would have been an elaboration of the hint of revolt against Davis and the search for a 'geographic approach' to a geomorphology 'free from those genetic speculations that are extraneous to geographical purposes'. Is there in this, Professor Jobberns asks, a danger of drift to airy empiricism?

Soils and Water

It is to workers in the United States of America, particularly C. F. Marbut, that much of the credit for the present appreciation of the areal study of soils should be assigned, writes *W. P. Packard* of Canterbury University College. The fact that some of Marbut's concepts, especially that of the 'climax', are not seen to need refinement illustrates the continuing importance of his work. However, in addition to defining and mapping categories of soils at different degrees of generalisation, the problems being pursued today include the thorny one of defining the use-potential of soils. The cautious attitude expressed here by Barnes towards the validity of defining use-potential is one with which workers in New Zealand are surely in agreement. The problem of scale in soil mapping has inevitably led to the use of the soil association, and this concept seems to be proving as valuable to pedology as did that of the plant association to plant geography.

From the viewpoint of waters on the lands, *R. H. Wheeler* of Victoria University College, Wellington, indicates that few geographers in this country have specialised in hydrology. The present chapter by Meigs is a most useful report on progress and an exciting source of references. The title is somewhat misleading, however, for it is one more often used in connection with man-made hydrology—irrigation—to which no reference is made.

A New Zealand hydrologist has remarked that the part played by geographers in this field has been exaggerated, but stresses that they have played an important part in popularising the results of various aspects of hydrological research. Generally the basic research and collection of data have been done by specialists who would not call themselves geographers.

ANIMAL GEOGRAPHY

In reviewing this chapter, *W. J. Brockie* of Auckland University College points to the inevitable comparison of the aims and methods of animal or zoogeography with those of plant geography. Such a comparison is valuable if only to emphasise differences inherent in these two branches of biogeography. Practical difficulties in organising material—the absence of divisions comparable with the plant formations, or the inability to recognise definite animal communities except in the most general terms on a world scale—have militated against rapid development of animal geography. Disagreement in aims and methods, and confusion regarding the limits of the subject are further aspects which serve to provide little stimulation or pertinent information to workers in the general field of geography. The prime reason for this divergence of zoogeography from geography as a whole is not hard to seek. This survey by Stuart reveals that it is essentially a specialist study carried out by systematic scientists. Consequently, the views of the zoologist or animal ecologist rather than those of the geographer permeate the few articles to be found in geographical literature.

While several studies use the facts of faunal distribution to characterise different parts of the earth (regional zoogeography), in no recent instance has this been the final aim. The majority of the works read showed that regional zoogeography simply provided a descriptive basis for the study of animal distribution as a true causal science (causal or historical zoogeography), or as a means to demonstrate how the present pattern is sustained in terms of environmental conditions and adaptation to habitat (ecological zoogeography).

As yet there is little more than an awareness among zoogeographers of the inadequacies of their existing discordant approaches. Zoogeographical research in accord with the unified theory of geography expressed in this book offers unlimited scope to the geographer who is at once skilled in regional method and systematic zoology. Only then will interrelationships of real significance and value to geography be demonstrated.

MEDICAL GEOGRAPHY

Commentary on similar lines comes from *J. K. Cunningham* of Canterbury University College when he underlines the fact that Jacques May defines medical geography as a study of the areal distribution of disease and its relationship to the environment. In view of this definition, it is not surprising to learn that the field has been developed almost exclusively by the medical profession. As a result, the bulk of the chapter discusses the research made by bacteriologists, biologists and entomologists.

Nearly all studies in the field focus attention upon the pathological factors, and the environment is considered only in a subsidiary way. Nevertheless, although May believes that the scientist is best fitted to analyse the connection between habitat and pathological phenomena, he considers that the geographer is better fitted to view disease as an element of the total environment. Such a view is encouraging, for it enables the regional geographer to make an indirect contribution to a highly specialist field by making disease an integral part of any area he studies.

May concludes by venturing that once a global picture of the proportionate prevalence of certain pathological phenomena is outlined, it may be found that the same pathological phenomena always occur under similar environmental conditions, and that the occurrence of certain diseases precludes that of others in the same areas. Such a forecast would seem to suggest that geographers might perform useful work in synthesising and correlating material made available by more specialised workers.

L. Curry would agree with this conclusion in as far as it applies to physiological climatology. Lee, writing on this topic, draws the bulk of references from animal and human physiologists, and from engineers. Huntington is the only geographer to have ventured into this field, and to the naive indiscretions of his popularisers only polite attention is given.

FIELD AND LABORATORY TECHNIQUES

The importance attached to fieldwork by American geographers leads *W. P. Packard* to maintain that it is understandable to find one of the concluding chapters in the book devoted to the procedures and techniques of geographical field study. The account is clear, if a little wordy. Of the specific approaches detailed the most important, and distinctly North American, contributions are those of the fractional-code notation system and the mapping of associations of phenomena, especially by the unit-area method. This latter has been widely publicised through its successful use by the Tennessee Valley Authority under Hudson. Both of these admirable shorthand devices for mapping the areal extent of phenomena have, and have had, a place in geographical fieldwork in New Zealand. It is pleasing to find the bold statement that 'properly a reconnaissance is preliminary to some other operation', for too many geographers have been prone to consider its more rapid techniques as producing final results.

D. W. McKenzie, Senior Lecturer in Geography at Victoria University College, Wellington, commends Kline's discussion on the interpretation of aerial photographs, for these are tools of increasing value to the geographer and are complementary to the map. Kline deplores the tendency to omit from university work any systematic study of the interpretation of aerial photographs, or to delay such study until post-graduate years. This criticism is soundly based. Students should work with aerial photographs as they do with maps, and become familiar with them by regular use. This is particularly important in a country like New Zealand where there are few large-scale maps but where the photographic coverage is excellent.

Kline examines the prospect of the increasing use of colour, with its value for crop identification, and of new stereoscopic techniques. He refers only briefly to one of the most valuable uses of the photograph, the comparison of the same area at different periods, a technique which promises to become even more useful as time passes.

Geographic Cartography

The final chapter is one of integration, for all aspects of geography have their cartographic problems. As *S. S. Cameron* of Auckland University College demonstrates, this is indeed a balanced, well-documented, up-to-the-minute review of the whole field of geographic cartography, together with penetrating and thought-provoking analyses and evaluations of each significant aspect. Geographic cartography is treated not as the traditional domain of 'clever draftsmen', but as a dynamic entity of which the geographer himself should have full and adequate knowledge in order to control and direct it at every stage from fieldwork to finished map. Only then will the map really fulfil its so oft-proclaimed role as the medium which belongs especially, if not uniquely, to geography.

To the British reader it may seem that the impact of the second World War is overemphasised, but any objective comparison of the American mapping scenes of say, 1940 and 1950, shows that the war not only made the United States realise that her domestic mapping status was far inferior to that of Europe, but also provided the impetus which has resulted in cartographic supremacy today—and this not in terms of quantity production alone.

A problem treated here in its American context, but relevant to New Zealand, is the question whether the increasing control of all mapping by government agencies should necessarily inhibit the activities of universities and societies. Robinson's answer is given by the wide field of geographical research which he demonstrates to be open. New, purposeful projections can be explored; landform representation improved; devices for the mapping of statistics systematised and developed; the multiple variations of colour, design, typography and reproduction techniques exploited to the full; and critical analyses of existing maps, their inherent qualities, reliability and coverage undertaken. And further, results of all this independent and fundamental research should be available to the official authorities producing maps of use to the geographer, as in turn their empirically-gained technological advances should be his to share.

GEOGRAPHIC NOTEBOOK

CONTRIBUTORS TO THIS ISSUE. The historical geography of New Zealand is a fascinating study, and never more so than when interpreted by Dr. Kenneth B. Cumberland, Professor of Geography at Auckland University College. Professor Cumberland requires no introduction to the readers of the *New Zealand Geographer,* for his mark has lain on the pages of that journal these last ten years. It is fitting, then, that on his relinquishing the post of Editor of the New Zealand Geographical Society the first article in this issue should be the fourth of his series on the historical geography of this country. The period is one distinguished by an economically and politically ascendant South Island—of wheat and wool and exploitative industry—but it was one which already bore the seeds of change. Refrigeration was soon to change the face of the New Zealand landscape, to lay emphasis on meat and dairy produce, and to pave the way for the future significance of the North Island.

In preparing this article Professor Cumberland has been aided by the research of Mr. R. P. Hargreaves, formerly a postgraduate student in the Department of Geography at Auckland University College, and now a research fellow in the University of Wisconsin at Madison. 'Middle Island Ascendant: New Zealand in 1881' will be published in two parts, this first part representing a general survey. The regional interpretation will follow in the next issue of the *New Zealand Geographer.*

Mr. J. S. Duncan is Lecturer in Geography in the University of Manchester. Before leaving for England in 1949 to take up a travelling scholarship, Mr. Duncan was in charge of geographical work on the national atlas, and before that he took his master's degree at Canterbury University College. Mr. Duncan has always demonstrated his interest in the geography of population and settlement, especially urban geography, and his present article is a valuable contribution to the appreciation of the varied character of New Zealand's urban landscape.

Five years ago a first article by Mr. A. J. Rose appeared in these pages. Now Mr. Rose again takes up the story of part of the Nelson provincial district, emphasising on this occasion the remoteness and isolation of this little-known part of the South Island. Since leaving the Department of Geography at Canterbury University College, Mr. Rose has been Lecturer in Geography at the college which is now the University of New England, Armidale, New South Wales, and recently he has been studying in London with the aid of a grant from the Rockefeller Foundation.

Another Australian contribution is that by Mr. Peter Scott, Senior Lecturer in charge of the Department of Geography in the University of Tasmania, and formerly of the Department of Geography, University of Cape Town. Like Northwest Nelson, Tasmania remains a little isolated, a little forgotten, and readers of this journal will indeed be indebted to Mr. Scott for making them aware of some of the facets of the sheep-farming economy of that island state.

Mr. R. H. Wheeler, who writes on exploration in Fiordland—a corner of the South Island even more remote than Northwest Nelson—is Lecturer in Geography at Victoria University College, Wellington. Mr. Wheeler's 'eye for country', his humour and his descriptive talents augur well in this his first contribution to the *New Zealand Geographer.*

The review of *American Geography, Inventory and Prospect* is the combined effort of almost every university teacher of geography in New Zealand, and in addition other reviews, notes and commentaries have been written by Professor A. C. Keys and Mr. G. R. Lewthwaite of Auckland University College; Professor C. A. Cotton, Mrs. J. K. Bewley and Mr. G. Palliser of Wellington; Dr. R. A. Falla, Director of the Dominion Museum at Wellington; Mr. A. D. Tweedie of Newcastle University College, N.S.W.; and by the Editor.

RECENT SCIENTIFIC WORK IN THE FIELD. It is timely to mention at the beginning of the new 'expedition season' a few of the investigations carried out in New Zealand during the last summer. In addition to the Fiordland expedition described in this issue of the *New Zealand Geographer,* the Canterbury Museum sent another scientific party to the Martins Bay area of South Westland. Formerly renowned for the richness of the rarer South Island low-altitude bush birds, this area was found to have a distressing scarcity of native bird life, attributable, it is believed, to the invasion of stoats since 1935. Material observations for museum habitat displays of bush birds were brought back, together with thousands of specimens of native plants and invertebrate animals.

The New Zealand Archaeological Association organised its first expeditions last summer. One to Great Mercury Island, off Coromandel, completed a full archaeological survey of the island and undertook excavations. A section was cut through the terrace system of a pa to include characteristic pits, generally believed to be house foundations. The other expedition completed a full excavation of an inland moa-hunter site in the stream bed of the Hawksburn in Central Otago. The evidence gathered favoured the hypothesis of a transitory occupation by hunters who left bushels of flint knives and midden bones from a round-up of moas. Important implications on possible climatic change emerge from the evidence of any moas killed by these early men in inland South Island.

During late 1954 and the beginning of this year the Dominion Museum, Wellington, had several parties in the field as well as scientific investigators working alone. In late November one expedition, led by the Director and made up of representatives from scientific departments such as the Animal Ecology Section, Botany Division and Soil Bureau of the D.S.I.R., the Oceanographic Institute and the Cawthron Institute, visited the Auckland and Campbell Islands. The party travelled in H.M.N.Z.S. *Tui* and worked deep-water stations, studied rabbits on various islands, collected representative plants, took peat samples and soil profiles, and collected insects and invertebrates. Two small expeditions were made in the West Nelson area. One geologist from the museum, travelling in part by motorcycle and in part on foot with a party of Tararua Club trampers, reconnoitred the Mount Arthur Range, Mount Lodestone and Cape Farewell and collected various fossils. Three other members of the staff of the Dominion Museum made another quick preliminary investigation, this time of caves possibly containing prehistoric bird remains on the Paturau River, at West Haven Inlet, and in sinkholes on Takaka Hill.

In January the well-known vessel *Alert* took scientists from the Dominion Museum and the Wildlife Branch of the Department of Internal Affairs on a preliminary biological survey of the Snares Islands. Diverted by the weather, the party carried out an intensive collection of invertebrates from the forest floor near Port Adventure, Lands River, Port Pegasus and Easy Harbour, and on the mainland of Stewart Island. A vast amount of hitherto undescribed material was collected and new records gathered on the known seabirds of the area. The habitat of subantarctic terns was found to extend as far north as the islands of the South Cape Group where they were found in plenty.

Government departments such as the Geological Survey and the Wildlife Branch have parties constantly in the field. The latter organisation made a study from November to January of a complete breeding season of the takahe and banded many birds, and in addition carried out a major survey of the wapiti area northwest of Lake Te Anau. As always, staff and students of the departments of natural science in the various university colleges undertook excursions by land and sea to gather data and specimens. Much fieldwork in New Zealand is done, of necessity, in the summer, usually in the holiday period, not only by scientists and students but also by interested lay personnel. Biologists, geologists and geographers, too, are active then and throughout the year collecting data which will later be incorporated in theses for higher degrees or in papers for publication in scientific journals. The 'expedition season' is indeed a busy one.—R. H. WHEELER

PRESENT STATE OF NEW ZEALAND AGRICULTURE. The *Annual Report of the Director-General of Agriculture* for the year ended 31 March 1955 summarises the solid progress of recent decades. Although neither occupied area nor labour force has increased, more efficient use of land and labour are apparent. Between 1921 and 1954 the number of holdings increased from 84,100 to 90,500, the area in sown grasses by about ten percent, and utilisation of artificial fertilisers by five hundred percent. Mechanisation has increased apace—the number of electric motors has risen from 456 to 125,000; that of tractors from 380 to 55,600; milking machines from 10,400 to 38,000; and shearing plants from 5,300 to 21,000. These and other developments have expanded the volume of output per unit of labour by 180 percent. Livestock have multiplied and improved; numbers of breeding ewes have doubled; and the average number of lambs tailed per 100 ewes has increased from eighty-three to ninety-seven percent; and while dairy cows have increased by 127 percent, the average yield of butterfat per cow has risen by thirty-seven percent.

But this gratifying progress has a sobering background. The major market, the United Kingdom, has limitations and competition is keen. New Zealand's economy depends heavily upon overseas exchange, and it is a disconcerting fact that although the value of exports rose by 143 percent between 1946 and 1954, only fifteen percent of this increase can be attributed to increased volume—eighty-five percent reflected rising prices. Furthermore, a growth in home consumption is reducing the proportion available for export.

It is asserted that the volume of production can be sufficiently expanded by further intensification of land use and wider application of proven farming practices, but it is emphasised that alertness is essential if costs of production are to be trimmed, and that the economy of New Zealand should be moulded on recognition of the significance of primary industries. In order to assess potential production and export, the present output and trends of major export items are examined in the report on a county basis, and the results are presented in tables using areas tributary to major ports as a basis for subdivision. It is concluded that the average increase in volume available for export is 1.8 percent per annum—an indication that under normal developmental conditions the volume of exports will not match projected population growth, for a 2.5 percent increase seems essential if terms of trade remain at par. Increase of butter and cheese will be less significant than that of meat, the export availability of mutton, lamb and beef will be markedly affected by home consumption, and New Zealand's future dependence on export of lamb and wool will be accentuated. Expansion may come from marginal dairy farms, hill country which can be used for fattening, and 'harder country' which may assume great importance as a reservoir of store stock. Subdivision, pasture improvement, and fertilisation will be essential.

The bulk of the report is devoted to a survey of the technical work undertaken by the various divisions of the Department of Agriculture, but includes many items of interest to geographers. The Extension Division has paid increasing attention to marginal-land development problems, centring study and farm demonstration upon economies of land development in areas, such as the Volcanic Plateau, where recent advances have made improvement technically possible. Research experiments in progress at the end of 1954 numbered 2,465, and investigations into the effect of various trace elements, particularly molybdenum, are thought highly significant. Improvement of pastures and crops is proceeding, and the export of grass seeds is increasing. Statistics are given which indicate the distribution of fruit production, the changing location of vegetable production following the expansion of quick freezing and canning is commented upon, and grape and wine production are said to show much promise. The bee-keeping industry is adjusting to new conditions, poultry are increasing, and progress towards complete rabbit control is said to be continuing, with a consequent improvement in pastures.

The wool market has proved exceptionally stable and the future is considered assured, but the return of free marketing has reduced the export of pig meat and, in conjunction with competition from margarine, is compelling butter and cheese producers to pay closer attention to quality and to refine their methods to meet varied consumer requirements. Improved finish and careful packing of both butter and cheese are required. More drastic readjustments are taking place in the milk-powder industry, for world markets have been oversupplied, and an abrupt fall in prices has curtailed expansion and has led to the discontinuance of manufacture in two factories. On the other hand there has been accelerated a marked improvement in quality and packaging. Casein production is increasing, improved manufacturing techniques are being adopted by various segments of the dairy industry, and though farmers have given a mixed reception to raising of hygienic standards and to the intensification of inspections, they stand to gain from the ultimate effect of a salutary scrutiny.—G. R. LEWTHWAITE

THE FIRST GEOGRAPHY CONFERENCE. The prognostications which appeared in 'Geographic Notebook' in the last issue of the *New Zealand Geographer* were, in fact, fulfilled, for the conference was wholeheartedly supported. Up-to-date ideas and accounts of research were presented, and 'geography in New Zealand [was] progressively advanced'. In short, the conference was a success, and an achievement of high standing, higher than its promoters and participants had dared to hope. It is evident now that there had been latent need for such conference.

One is tempted to feel that in August 1955 geography came of age, and that it emerged from being just a section of a New Zealand Science Congress, and showed that it could exist in its own right. Moreover, geography at this conference was not just an academic discipline—practical recognition came, too. Teachers were helped to attend by the Education Department; the public was informed by reports in the press; and an awareness was shown by the civic and governmental authorities that geographical study can be of vital use to them. Those attending the conference realised by the end of the week that no other study could so properly embrace and synthesise such a wide range of data, nor present it in such an interesting manner.

The Presidential Address by Professor Kenneth B. Cumberland, 'Why Geography?' set a high standard. The paper following, which presented a somewhat different approach to geographical study, would have produced rich discussion and encouraged a healthy variety of viewpoint, had there not been a necessary time limit. This tight timing of the programme created a problem of which organisers of future conferences will take heed. In their endeavour to accept all papers offered for this first conference the committee had difficulties in arrangement. In future, more sessions might be run concurrently, as at the recent meeting of the Association of American Geographers where ninety-six papers were presented, thirteen in four general sessions, and the remainder in fifteen concurrent sessions in nine divisions. There would be more time, and groups would be smaller, the whole making for freer discussion. Experience now likewise suggests that the evenings might be left free for spontaneous or self-organised discussion groups to deal with matters arising from the conference—the discussion on the sixth-form examination syllabus providing a case in point this year.

Forty-seven papers were presented; and in addition there were a symposium on teaching aids, a film evening, a paper at the Annual General Meeting of the New Zealand Geographical Society, and half-day and full-day field trips held concurrently. The wide variety of subject matter presented in the papers was impressive, and so was the proof of New Zealanders' overseas experience in teaching and research. The lay members who were present had a rewarding time, but the teachers had even richer fare. Papers were read on every aspect of the teaching of geography from the primary school to the sixth form, and although discussion time was not always available, those who were interested were provided with the means of subsequent contacts by the printing of the names and addresses of authors in the programme. It is hoped that all members of the conference will receive synopses of papers presented, and they will then be able to give more leisurely consideration to the massive weight of material channelled through the auditory nerves in such a short time. The field-trips, too, were particularly interesting, and although the long excursion to the Waikato and Central Plateau was very strenuous, they were both most worthwhile. They practised what the conference preached, and reflected, in general, its capable handling.

One aspect of the conference was enough to justify the whole, namely, the very real amount of give and take, and genuine interest, shown by the university and school staffs in each other's requirements of the student. There was some frank speaking, which suggests a sound future for the subject in these institutions. If union is strength, much should come from the agreed reassertion of the place of active field work in the curriculum.

The 216 members who registered, from Southland to Northland and, seemingly, from every place between, would agree that the administration of the conference was excellent—the commercial displays, the New Zealand Geographical Society's library, the visual and other aids used in the sessions, and the information on the layout and facilities. This conference, then, justified everyone's hopes. It raised a new interest in geography that will be felt throughout the land. Such enthusiasm was generated that the organisers will find reward in the eager expectancy of the next conference three years hence.—GUY C. PALLISER

EDITORIAL. At the meeting of the Council of the New Zealand Geographical Society held in May this year, Professor Kenneth B. Cumberland formally relinquished the post of Editor to the New Zealand Geographical Society which he has held for ten years. Geography in this country owes much to Professor Cumberland. In particular the work of the New Zealand Geographical Society has derived its inspiration from him and its journal, the *New Zealand Geographer,* has been cast in his mould. It was for his services to geography that the New Zealand Geographical Society bestowed upon him at its Annual General Meeting its most signal honour—the Honorary Life Membership of the Society.

His successor in office is Mr. James W. Fox, the Senior Assistant Editor, who has been on the editorial staff since he arrived in New Zealand in 1947. Professor Cumberland has indicated his willingness to act as Consulting Editor, and Mr. G. R. Lewthwaite has accepted the post of Assistant Editor. Meanwhile Miss A. M. Iverach performs with skill, patience and understanding her specialist tasks in the printing works, and Miss E. Banks and Mr. R. G. Lister continue their capable editing of the other publications for which the New Zealand Geographical Society is responsible.

ACKNOWLEDGEMENT. In the previous number of the *New Zealand Geographer* acknowledgements which should have been made in the article, 'The Physical Geography of Western Samoa', were inadvertently omitted. Figures 7 and 7a were compiled with the aid of data from H. T. Stearns: 'Geology of the Samoan Islands', *Bull. Geol. Soc. Amer.,* Vol. 55, November 1944, pp. 1279-1332; and from J. A. Thomson: 'The Geology of Western Samoa', *N.Z. Journ. Sci. & Tech.,* Vol. 4, No. 2, April 1921, pp. 49-66. The data used in Figures 8 and 8a were supplied by Mr. W. G. McKay of the Public Works Department, Government of Western Samoa. Sincere apologies for these omissions are tendered to all concerned.

IN OUR CONTEMPORARIES

1. *In New Zealand Journals . . .*

Farming in Offshore New Zealand

FARMING AND RURAL LIFE ON THE CHATHAM ISLANDS: E. A. Madden, *N.Z. Journal of Agriculture*, Vol. 90, No. 4, April 1955, pp. 338-354.

This article is an important contribution to our knowledge of the only inhabited outlying island of New Zealand, and is in fact the first factual record of economic aspects of the Chatham Islands to appear for many years. It is not difficult to find good descriptive references and scientific reports, and Mr. Madden has made good use of these in introductory sections dealing with the history of settlement, the original vegetation, the climate and the surface configuration.

Although quite adequate for the purpose, the introductory section is a little lacking in balance. It could have been made a little more informative, for example, under the heading of climate, where the distinction made between prevailing winds and winds blowing 'with more force' could have been clarified by reference to wind roses or other graphic forms of representation. Mr. Madden points out that no soil survey of the Chatham Islands has been made, and he provides a tentative grouping of soils in terms of development on lands of volcanic origin, silty-clay country, consolidated-sand country, unconsolidated sands, peat land, peaty sands and limestone country, together with soils of intermediate types. There follows a short account of farming in which the point is made that the potential production of wool is not yet reached under present conditions. Unsuccessful attempts to develop dairy farming are described, and although these ended with the closing of the cheese factory about sixteen years ago, it is stated that there are still about a hundred dairy cows on the island used for local requirements. Nevertheless the amount of butter produced is small, and large quantities are imported from New Zealand.

The section on pasture types gives a good description of existing pastures, which Mr. Madden describes as being on the whole not of high quality. The opinion is expressed that with better management both carrying capacity and production could be substantially increased. The comparative failure of orchards and gardens seems to be due to a lack of sustained enterprise, and it is thought that considerable improvement is possible. Beekeeping, having been tried once without success, has not been attempted again, except for some recent and promising experiments, which are important because of the past difficulty in getting clover to seed.

After dealing with such factors affecting the economy of the islands and their industries as education, shipping, air services, internal communications, drainage, erosion, weeds and pests, and public welfare, the author sums up his opinion on future prospects with the conclusion that 'there are no physical reasons why progress should not be as rapid and as spectacular as it has been in parts of New Zealand. The similarity Chatham Island bears to the west coast of the southern half of the North Island indicates that North Island farming practices should replace the South Island ones which have prevailed in the past, and this must be considered in any future plans for land utilisation.' As a guide to such planning, Mr. Madden then sets out recommendations in sufficient detail to enable practical steps to be taken. These appear to be a positive contribution of great value for reference. In such matters as pasture renewal full detail is given of suitable composition and effective methods. These are related in a practical way to the author's firsthand experience of conditions and will certainly be appreciated by those interested in land development, as well as the Chatham Islanders themselves who should find the recommendations of direct value.

General matters such as the hazards and losses met with in shipping stock are dealt with, and might perhaps have been stressed a little more in the overall picture of the disabilities of isolation and distance suffered by the islanders. The lack of any provision for conservation of natural resources and the preservation of surviving habitat of native vegetation and soil types might also have been referred to; although, as Mr. Madden's main task related to the more immediate needs of farming and rural life, it must be conceded that he has done it well.—R. A. FALLA

2. *In Overseas Journals . . .*

REGIONAL GEOMORPHOLOGY OF NEW ZEALAND

LE RELIEF DE LA NOUVELLE-ZÉLANDE: A. Huetz de Lemps, *Revue de Géographie Alpine*, Tome XLIII, Fasc. 1, 1955, pp. 5-96.

The author claims no more justification for this article than as a review of what is known of New Zealand geomorphology and as an introduction to readers of books that touch upon the subject; but this modest appraisal of his own work does scant justice to its thorough-going character. This lengthy work, with its illustrations and its comprehensive bibliography, is indeed based on the published writings of New Zealand geologists and geomorphologists; but the author has not hesitated to express independent opinions clearly and at some length when he has thought it worth while. Such remarks are restrained, however, and are kept strictly within bounds. He rarely proposes any serious difference of interpretation of the evidence from that currently accepted. A matter that is of considerable importance to New Zealand readers, however, is that the work presents a much more complete regional treatment than is to be found in any English-language publication.

The illustrations—eight half-page photographic views and twenty-four line figures—are well chosen, appropriate, and, with very few exceptions, clear. Ten of the text figures are maps showing geological formations, but these display also the significant tectonic features on which the explanation of the relief must be based. Most of the figures serve their purpose very well, but Figures 6 and 16 are not quite as informative as they might be. On the latter (a section) the fault-angle structure of the Ruakokopatuna Valley is obscured by defective design, and on the former (an explanatory diagram) the relation to each other of the intersecting peneplains of Otago has been confused by drawing the younger of these surfaces more steeply inclined than the older one. One may note that the older of the intersecting surfaces is referred to throughout as Cretaceous, which is not always correct. The younger one might also be better dated 'late-Tertiary' than 'end-Tertiary'.

The general plan of treatment is as follows: the tectonic structure of 'blocks' and somewhat similar forms produced by warping and folding that determines major initial features; the erosional development, with emphasis on the origin of the pattern of river valleys and reference to such locally interesting matters as the degradation of tectonic scarps and the distinctions to be made between fault and fault-line scarps and between monoclinal and fault scarps; volcanoes and volcanic relief; glaciers and glacial relief features; and coasts; whilst a concluding section is devoted to 'the place of New Zealand in the structure of the Pacific'.

Up-to-date treatment is found especially in the chapter on coasts, where without minimising the importance of longitudinal outlines of tectonic origin throughout the islands, the author draws particular attention also to features attributable to transverse deformation. In the first section the abundance of fault scarplets in the seismic districts is referred to, and there is significant reference to the importance of transcurrent faulting—recognised in New Zealand only in the last few years.

During his stay in this country the author acquired a very thorough knowledge of its topography, and although the Sutherland Falls are confused with Sutherland Sound, errors of location are extremely rare. The editors of the *Revue de Géographie Alpine* are to be congratulated on their enterprise in printing an article of such length as this on a region so remote from Grenoble. Truly France is the modern home of geomorphology.—C. A. Cotton

Sequent Occupance in Southland

THE GROWTH OF PASTORALISM IN SOUTHLAND, NEW ZEALAND:

Howard J. Critchfield, *Economic Geography*, Vol. 30, No. 4, October 1954, pp. 283-300.

Reviews of New Zealand landscapes at selected periods in the past two centuries are not unknown to students of the geography of the dominion, and regional surveys of selected areas almost invariably indicate how present man-land relationships have evolved under white occupation with changing techniques and economies. In this article Dr. Critchfield applies this latter approach to some purpose in the southernmost of New Zealand's agricultural regions.

In accepting the Southland land district as his regional unit the author is bowing to the dictates of statistical compilation and admittedly the trends he seeks are adequately portrayed in this manner. But the Southland land district has not developed in isolation, as the small influence of its own temporary provincial government on land development indicates. In particular, trends in adjacent South Otago have been similar, the present development of browntop country in this area having been already achieved on the Southland plain. However, the land district chosen does cover a wide range of physical landscapes and adds weight to the arguments that intraregional variety and stage of development is conditioned by the physical background. Only in the more favoured parts of the area has the transformation from potato patches to fat lambs, wool and dairying been fulfilled. Other stages in the sequence are still in evidence elsewhere, even to the importance of seed potatoes as a pioneer cash crop in the cutover forest areas of the Waiau Valley. In the light of his later conclusions the author might have made more of this merging in space as well as in time of the phases in the growth of pastoralism in Southland.

Squatting was never a phase in Southland's agricultural history, nor did settlement follow the organised patterns of other South Island colonies. The successful advent of refrigeration meant the intensification of trends already evident, for the activities of the New Zealand and Australian Land Company had already pointed to intensive land use and dairying by its subdivision of the Edendale estate. Refrigeration, for Southland, meant a modification of an earlier pastoralism. With smaller properties came the changes noted elsewhere in New Zealand—soil and pasture improvement, better transport, adequate drainage—but always with a difference. The harsher climates of Southland demanded supplementary fodder crops and farming techniques not always needed elsewhere. The shift of emphasis from dairying to fat-lamb farming has been a response as much to the restricted growing season as to the depleted labour force. Thus this story of the sequent occupance of Southland highlights the author's thesis that in this area man has made 'a purposeful adjustment to his physical environment'.—A. D. TWEEDIE

REVIEWS

A Frenchman in New Zealand in 1840

THE VOYAGE OF THE *ASTROLABE*—1840. An English rendering of the journals of Dumont d'Urville and his officers of their visit to New Zealand in 1840, together with some account of Bishop Pompallier and Charles, Baron de Thierry, by Olive Wright. Wellington: A. H. and A. W. Reed, 1955, pp. 180.

This is a companion volume to *New Zealand 1826-1827* and enhances the scholarly reputation that Olive Wright gained in 1950 as a competent translator with a literary flair. *The Voyage of the Astrolabe—1840* is in two sections. In the first part the author has translated those chapters of the *Voyage au Pôle Sud et dans l'Océanie* which relate to New Zealand. The second part consists of biographical essays on Bishop Pompallier and Baron de Thierry, together with a selection of extracts from early documents relating to the Bay of Islands.

From the point of view of the historical geographer there is much that is new and significant in this volume. Perhaps the most pertinent of d'Urville's observations relate to the conditions which obtained in the Bay of Islands in 1840. This was his third visit, and his record of the changes which had taken place since 1827 is depressing. 'The natives' houses were evidence of the most abject poverty. . . . Their way of life, far from improving, was deteriorating.' Labour was already very scarce and wages high. The only supplies which could be procured were a few vegetables and some pigs at three times the price they would have been in Hobart. In the opinion of d'Urville no place could have been worse than Kororareka as a place for replenishing stores. There is evidence of other resources, for at Waitangi d'Urville sampled a 'light white wine, very sparkling, and delicious to taste' which was the product of a flourishing local vineyard.

But this was the last port of call. The author begins the narrative in February 1840 when the *Astrolabe* and *Zélée* arrived at the Auckland Islands. Dumoulin, listed as an engineer and geographer on board the *Astrolabe,* has given a vivid account of these islands. From the Auckland Islands the expedition sailed via the Snares and Foveaux Strait to Otago Bay, where three days were spent charting the harbour and recording both the natural and cultural features of the landscape. Site and size of the Maori settlements were recorded and here are the first accounts, by d'Urville and his officers, of the squalor of the whaling settlement and of the degradation which the Maoris had suffered by contact with the Europeans. There was no trace of any skilled industry, and the phormium cloaks had been replaced by European garments, much tattered and worn. The reconnaissance of the area included estimates of the population and the farming potential.

From Otago the *Astrolabe* and *Zélée* sailed to Akaroa which, like Otago, d'Urville visited for the first and last time. The same sorry deterioration of the Maoris is recorded and a similar reconnaissance to that described for Otago was carried out. Thence the route was via the east coast of the North Island to the Bay of Islands where the Treaty of Waitangi had recently been signed. The account of this historic occasion as related to d'Urville and his officers is very different from the accepted version. Overall, the picture of British protestant colonisation is not a favourable one, but a slight religious bias is apparent here.

In the second and shorter part of the book the biographical studies of Pompallier and de Thierry make fascinating reading, and together with the account of the Bay of Islands in 1840 are of historical significance.

The Voyage of the Astrolabe—1840 is extremely well documented with explanatory notes, bibliography and index. Although no general map is included, fourteen contemporary engravings and three line sketches illustrate this beautifully-produced book which is a welcome addition to the growing volume of literature on early New Zealand.—JOYCE K. BEWLEY

A FRENCHMAN LOOKS AT NEW ZEALAND TODAY

AUSTRALIE ET NOUVELLE-ZÉLANDE. By A. Huetz de Lemps. Paris: Presses Universitaires de France, 1954, pp. 124.

It is not uncommon nowadays to find our newspapers giving prominence to remarks and comments on the way of life in this country, especially if the comments are slightly provocative, and most of them, naturally enough, have come from British or American sources. The comments of M. Huetz de Lemps are not intended in any way to be smart or clever. His little book is a sober description of modern Australia and New Zealand by a trained and observant geographer with an eye for relevant detail and a reasonable knowledge of the history of the two countries. It may not be quite 'traditional', as M. Huetz de Lemps says, to study Australia and New Zealand together, but the parallel descriptions of the two countries make comparisons on any one topic both easy and interesting. For anyone who wishes to concentrate on one country or the other, it is a simple matter to skip certain paragraphs.

M. Huetz de Lemps begins with physical features—the monotony of the Australian relief is contrasted with the variety of that of New Zealand; the arid climate and bareness of one with the 'oceanic' climate and greenness of the other. The second chapter entitled *Le Peuplement* begins with aborigines and Maoris and sketches the history of New Zealand up to the elections of 1951. It ends with a note of warning: 'The people of New Zealand live lavishly in a rich country and tend to be lulled into quiet prosperity,' but he adds that responsible men are keeping an anxious eye on the Far East.

For the average reader the most interesting chapter is the one on the present-day population. From a New Zealander's point of view there is nothing very new here —the low death rate, high expectation of life, two-thirds of the population in the North Island, the growth of urban population, and so on. The same might be said of some of the author's pen pictures, but for French readers there will be an element of the picturesque, for example, in the life of small towns concentrated into one street lined with shop verandahs; Auckland's volcanic cones; Wellington largely reclaimed from the sea, 'son climat rude, aux vents violents'; Christchurch the cathedral city; and Dunedin, retaining 'the guttural accent of its ancestors'.

The levelling of class differences would naturally strike M. Huetz de Lemps, who is obviously appalled that 46.3 percent of the budget is spent on social security. There is no poverty; the civic spirit is good; and the people are law-abiding. Individual initiative, generally speaking, is lacking. We like sport, but are far less interested in matters intellectual, in spite of our democratic educational system, including its 1,700 school buses.

The final two sections are devoted to agriculture, industry and commerce. The most notable fact that emerges here is the difficulty of securing labour, its high wages and its doubtful reliability. The standard of living is high, but the country is not self-sufficient. The women of New Zealand, it is suggested, are more advanced and discerning than the men. Observations on our way of life include comments on numerous cups of tea and constant eating between meals ('on mangeote toute la journée'); the wooden houses with iron roofs, full of electrical gadgets but no help, with no decent heating, but abundantly equipped with radios and telephones.

In his year spent in New Zealand in 1952 as a *lecteur* in the university colleges of the North Island the author garnered a vast amount of information, and he has presented it here in a compact and entertaining form.—A. C. KEYS

THE EMPTY NORTH

NORTHERN AUSTRALIA—TASK FOR A NATION. Edited by J. Wilkes. Sydney: Angus and Robertson, 1954.

Australians have ever been a little self-conscious about their tropical north. Perhaps no issue attracts so much opinion, well-informed and otherwise, on the part this area is to play in the future development and settlement of the continent. An empty north is apparently a provocative challenge, whatever the facts about resources. Undoubtedly, in the face of the new nationally-conscious Asian peoples, Australians feel more than ever the need to make at least some token development in this area, the population densities of which contrast so vividly with those of the deltas of Southeast Asia. Undoubtedly too, the new importance of radioactive minerals in this area means a renewed assessment of the importance of tropical Australia to the Australian nation. As in all spheres of national development in present times, the issue is as much political as geographical.

It is understandable, therefore, that the Twentieth Summer School on the Australian Institute of Political Science meeting at Canberra in January 1954 should choose the development of tropical Australia as the subject of its symposium. It is understandable, too, that the stress should be laid on the 'how' rather than the 'why' of development—the assumption being that defence needs alone demanded a populated north.

The papers read to the school form the chapters of this book, and the result is a comprehensive review of the present resources, possible development and future needs of the area by a well-informed panel. The physiographic background is surveyed and the present and potential mineral resources assessed. Problems and possibilities in both the pastoral and arable phases of land use are considered. Transport deficiences are stressed and the relative merits of rail and air transport argued. The administrative, political and social aspects of development are debated and the possibilities of attracting capital and settlement into the area are reviewed. Individual papers are grouped under these major headings, to each of which is appended a report of the discussion which followed the reading of papers.

In 'collecting, discussing and making widely available the best information and opinion' on this Australian pròblem the institute has carried out its self-appointed task well. In the words of the Governor-General in the preface, it has made a forceful 'appraisal of the situation'. Not all the ideas and opinions expressed are new. The problems of leasehold tenure, the shortage of labour, the difficulties of climate, the hardships of family life, and the need of government assistance both directly in transport facilities and indirectly in taxation concessions are again stressed. Again the inference is made that the expenses incurred should be charged against the defence vote of the Commonwealth, for none of its speakers seemed convinced that the resources of the tropical north—with the isolated exception of favoured patches of the east coast of Queensland—could, under present conditions, attract capital and settlement in their own right.

Not all the chapters read as vividly as Grabowsky's plea for definite and immediate air freight services instead of possible and future railroads. Although all speakers produced positive arguments for specific methods of development, few attempted a regional subdivision from which priorities in development might be considered. But the material is lucidly presented, the illustrations wisely chosen, the papers well arranged, and the discussions lively and pertinent. Although not specifically geographical in design or outlook, this is a book that will be well received by students of Australian geography as the best statement on this area since the report of the Payne-Fletcher Commission in 1937.—A. D. TWEEDIE

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THE NEW ZEALAND GEOGRAPHICAL SOCIETY

THE NEW ZEALAND GEOGRAPHICAL SOCIETY was founded officially in Wellington towards the end of 1944. Its real foundation, however, took place in Christchurch in 1939 when a group of enthusiasts formed what is now the Canterbury Branch of the Society. Their lead was followed in February 1944 in Wellington, and further branches came into being in Auckland and Dunedin early in 1945.

The aims of the Society as stated in the constitution are 'to promote and stimulate the study of geography'. These are the aims of more than one society in the world, and the New Zealand Geographical Society is particularly concerned with geography in New Zealand. It is therefore the Society's policy to stimulate geographical studies about New Zealand and matters closely related to the Dominion.

The Society undertakes the publication of a journal which at present appears twice a year. Branches of the Society organise lectures, study groups, and excursions, and encourage their members to prepare matter for publication in the Society's journal, the *New Zealand Geographer*. Contributions from overseas writers and those who are not members of the Society are also encouraged.

The Society also publishes half-yearly the New Zealand Geographical Society's Record of Proceedings of the Society and its branches, known as the *Record*. This, in addition to summaries of addresses given to branches, contains book reviews, film reviews, and contributions of a lighter nature than those appearing in the *New Zealand Geographer*.

Selected articles from the *New Zealand Geographer* are reprinted and issued separately in the *Reprint Series*. Those that have so far been made available in this form are *Weather Forecasting in New Zealand*, by Ian E. M. Watts; *Literature and Landscape in New Zealand*, by Alan Mulgan; *Manufacturing in New Zealand: Its Outstanding Characteristics*, by J. L. Hewland; *Land Utilisation in Metropolitan Christchurch*, by F. Parks; and *The Importance of the Land: The Future of New Zealand Agriculture*, by Kenneth B. Cumberland.

The Council in 1947 decided to proceed with the publication in book form of a series of *New Zealand Geographical Society Special Publications*. Moneys have been set aside for this purpose, and as material of high quality and real value becomes available it will be published. The first special publication, *New Zealand Weather and Climate*, edited by B. J. Garnier appeared in 1950 as the first number in the Miscellaneous Series. In addition, the publication of a Research Series is planned.

Membership of the Society is open to all persons interested in the aims of the Society. Full details of membership will be sent on request by the Secretary, New Zealand Geographical Society, Department of Geography, Canterbury University College, Christchurch, C.1.

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TO CONTRIBUTORS

Members of the Society and subscribers to the *New Zealand Geographer* will have noticed that the journal does not always appear during the months of April and October. Every endeavour is made to publish the *New Zealand Geographer* in time, but the Editor is largely in the hands of contributors. The work of editing and publication would be greatly facilitated and expedited if the following points were noted:

1. All copy intended for publication should be in the hands of the Editor by the beginning of October for the April number, and by the beginning of May for the October number. Late copy can be accepted only in special circumstances. Alternatively, it may be held over.
2. Articles, notes, commentaries and reviews should be typed, double-spaced, on quarto paper.
3. Maps and diagrams must be drawn in indian ink and be ready for reduction. Their dimensions must be of a reasonable order and should not be more than three times the page size of the *New Zealand Geographer*.
4. Photographs must be printed for contrast on glossy paper.
5. As far as possible, contributors should follow in their footnotes, captions and lettering the established style of the journal.

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